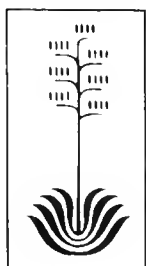
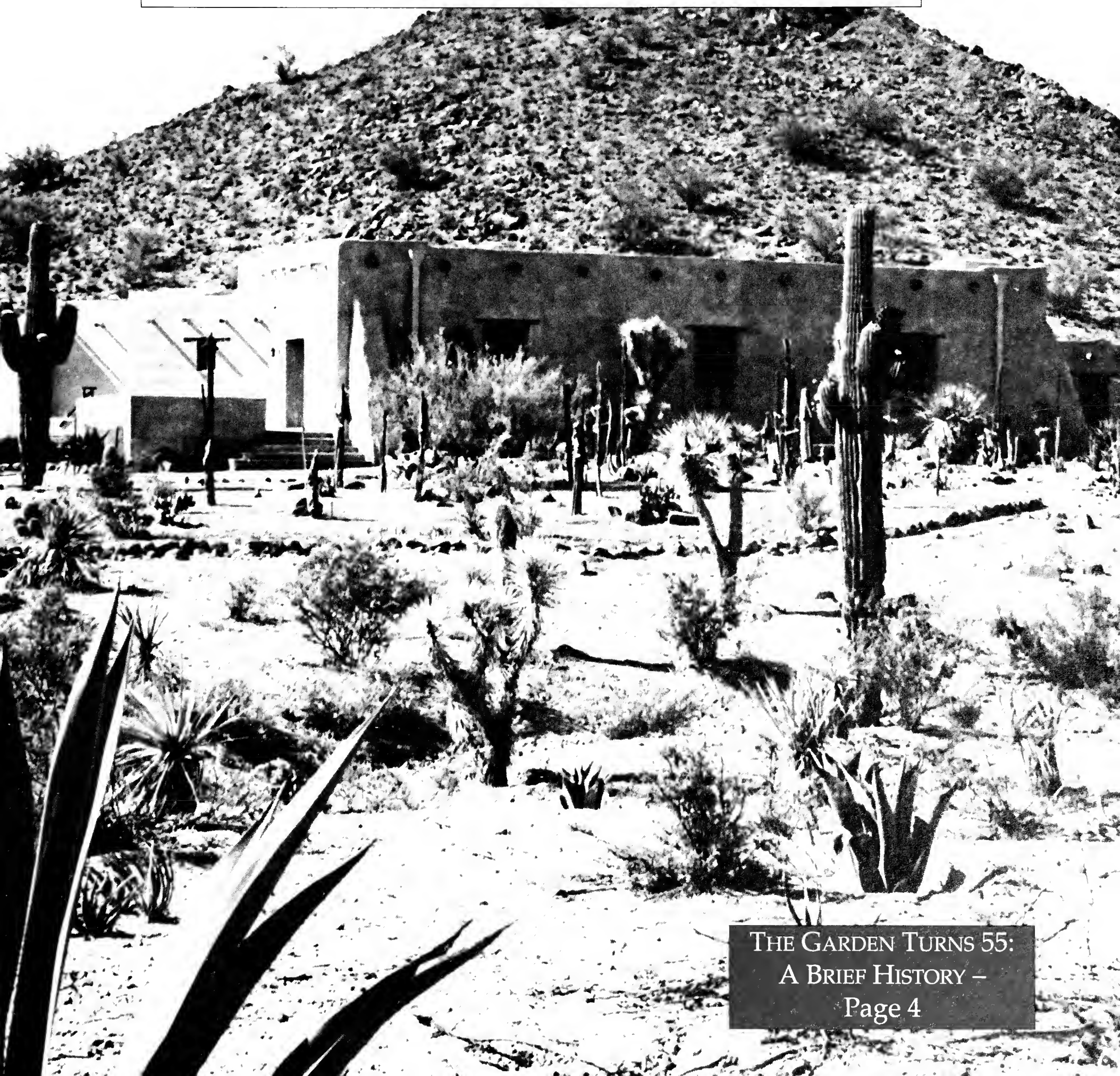


THE



SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona
March - May 1994/Volume 48, No. 1



THE GARDEN TURNS 55:
A BRIEF HISTORY –
Page 4



Desert Journal

Meditations on the Garden at 55 Years; Some Hopes for the Future

By Robert G. Breunig
Executive Director

On February 12th the Desert Botanical Garden turned fifty-five years old. In thinking over this history, I recall a visit a few years ago, in May of 1986, with our first director, Dr. George Lindsay. We walked around the core part of the Garden as Dr. Lindsay reminisced about the early days. We stopped on the main trail and marveled at the large cardon cacti which now form one of the most dramatic points of the entire Garden. He commented on how much they had grown since he planted them in 1939. I was struck by the realization of how satisfying it must be to see such tangible results from one's labors nearly fifty years ago.

The conversation also reminded me that we must actively plan today in order to have a collection that remains as pleasing and complete tomorrow. The core garden now is an example of far-sighted planning in the past. We are still looking ahead on behalf of the future, not only planting the plants that will be a part of our displays fifty years from now, but also planning facilities as well as finances to meet our long-term needs.

Five years from now the Garden will turn sixty. It is our hope that the Garden will, at the turn of the millennium, be ever closer to achieving the goals of its long-term plan.

By age sixty we hope to complete our Garden interpretive plan, adding to the recent improvements in the core garden a new set of interpretive trails on desert ecology, diversity, and conservation.

We hope to make significant additions to our collections, adding well-documented specimens

to fill in the gaps, primarily in our cactus and agave collections.

We hope that our conservation program will continue to preserve the rarest of the rare desert species and will arrest the potential tide of desert plant extinction.

We hope our research will assist the conservation of desert species and expand our knowledge of both desert horticulture and the evolutionary history of desert plants and their ecologies.

We hope to have new facilities to accommodate our educational, horticultural, research, administrative, and retail needs, and which, like our new path system, will be seamlessly integrated into the historical context of the Garden and look as if they have always been here. We want these facilities to suit the Garden's architecture and landscape and especially to reflect the importance of plants above man-made structures.

To add to these few ideas, we would like to know what dreams our members have for the Garden we share. We invite you to submit them for the planning process.

We also hope by age sixty to publish a definitive history of the Desert Botanical Garden; and we invite any members and friends who have historical recollections and photographs to share them with us so that we may begin to incorporate them into a comprehensive body of historical work.

Photographs and recollections of the Garden's "middle years"—the fifties, sixties, and seventies—would be particularly valuable. In the meantime we hope you enjoy this issue's preview to that history. ♦



photo by Elliott Lincis

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Dr. Lindsay with
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ABOUT THE COVER:

The Desert Botanical Garden looked like this in 1941, when Charles B. Fleming, Jr., the Garden's second director, made this photograph. The Administration Building, now Webster Auditorium, was dedicated on March 1, 1940. In 1990 a restoration of the building was completed and it was entered on the National Register of Historic Places.



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Plantings at Webster Auditorium in spring, 1940

photo by George Lindsay



Plantings in the 1950s

photo by George Lindsay



Plantings in spring, 1994

photo by Carol Schatt

Growth of the Garden —

By Carol Schatt

Two days before Valentine's Day, 1939, when Arizona herself had just turned twenty-seven years old, ground was broken in Papago Park for a "clubhouse" for the Arizona Cactus and Native Flora Society. This was the start of the Desert Botanical Garden, whose first plants had been put in the ground the previous December. The garden, a dream of the five-year-old native plant society, was inspired by Gustaf Starck and mid-wifed into existence by Gertrude Divine Webster.

Starck, an engineer for the Salt River Valley Water Users' Association, was known as the local authority on cacti and succulents. The first president of the Arizona Cactus and Native Flora Society, he promoted the preservation of cacti and the desert. He also insisted on using the Latin, rather than common, names for plants. His collection of seven hundred cactus specimens became a part of the first collection at the Garden.

Mrs. Webster, who greatly enjoyed her own impressive collection of cacti at her winter estate on Camelback Mountain, had followed Starck as president of the Arizona Cactus and Native Flora Society. She put up \$10,000 toward the initial development of the infant garden and donated to it a "forest" of plants. She also suggested the society's early slogan: "Not to destroy but to glorify."

The new garden, carved out of 306 acres in Papago Park by the State Legislature, was to preserve desert plant life as well as to display and interpret it; it was to be administered by the Arizona Cactus and Native Flora Society.

It was in 1939 that young George Lindsay paused in his botany studies to serve as the Garden's first director. With young men from the National Youth Administration, he built the Garden's "hardscape" and planted it.

By the time Webster Auditorium was built and dedicated in 1940, over five thousand native cacti and plants had been transplanted to the

A Dream Well Nurtured

Garden. During George Lindsay's year as director, the Garden's basic structure was established—the walkways, the earliest beds, the plants which have grown to awesome grandeur, and the administration building (today's Webster Auditorium). The plants—salvaged, donated or obtained by permit—came with good scientific data which was, in those pre-computer days, stored in accession ledgers and on file cards.

Then came some dark years for the incipient garden. Only months after Lindsay left, World War II began for the United States, bringing with it gasoline rationing, loss of manpower, and a different direction for public interest.

Charles B. Fleming, Jr., a native Arizonan with a master's degree in ecological botany and a passionate interest in birds, was by then the Garden's second director. It was he who nurtured the Garden through its second year, fighting back the jackrabbits who ravaged the plants, continuing to build soil and planting beds, conducting Saturday classes to teach children and adults how to appreciate and care for desert plants. He spoke widely on the lore, medicinal and common uses of desert plants, and brought in botanists for Sunday afternoon talks.

During the war years the Garden eventually



Early transplants included barrel cacti from Ajo.



Joshua trees salvaged from Congress Junction

from the estate of Douglas Cain

closed. People had neither time or gasoline to get to the Garden. Military units stationed in Papago Park dragged their caissons through Garden beds and occasionally even shelled the area in target practice. Caretakers came and went fast and did little while they were here. The devoted Mrs. Webster was far away in New York; membership in the Arizona Cactus and Native Flora Society declined. Volunteers used their own gas rations to drive out to the Garden and water the plants as often as they could.

Despite the interruptions and toll of the war, however, very important pieces of the Garden survived. The beginnings of a scientific collection had been established, the basic physical structure of the Garden had been developed, and many of the plants were still growing.

MIDDLE YEARS: from war to boom-town

The effect of the war was to leave the Garden in physical disarray and financial quicksand. Membership had fallen to nineteen. Gertrude Webster came to the rescue one last time; dying in 1947, she bequeathed a then-significant trust whose income was dedicated to the Garden.

At this time, W. Taylor Marshall, an energetic, former salesman and self-taught botanist, was director. His efforts and the humorous cartoons of Reg Manning, a Garden enthusiast from the beginning and prize-winning cartoonist for *The Arizona Republic*, promoted the Desert Botanical Garden with cartoons that tweaked public interest in the desert's unusual plant life. By 1950, Garden membership had grown to 400; 120,000 people visited the Garden each year from 1950 to 1955. Riding this crest of public interest, the Garden built the Cactus House in 1952.

As the community burst into flamboyant
(Continued on next page)

"As the Garden began to evolve, the plants themselves continued to grow. . . . The Garden began to look like a botanical garden."



DBG photo

Archer House when Director Earle and his family lived there

growth, the Garden grew, quietly, both internally and internationally. W. Hubert Earle, who came here from the midwestern U.S. for his health and was hired as a horticulturist, became director of the institution in 1957 and remained in that position for nineteen years. During his administration the Visitor Building/Book Shop was constructed in 1961; the Leaf Succulent House was built, and dedicated in 1965. Plant collections also grew, with major additions to the aloes and cacti. A library and an herbarium were built.

In 1972 Dr. Howard Scott Gentry joined the Garden staff as its first Ph.D.-level botanist. A world expert on agaves, Dr. Gentry began to systematize the collection and also produced a major scientific monograph, which brought increasing international scientific attention to the Garden.

Throughout these years as the Garden began to mature and evolve as an institution, the plants themselves continued to grow and develop. The Garden began to *look* like a botanical garden.

RECENT YEARS: a strong community presence

By the mid-1970s what had been a period of internal development and quiet growth began to feel quiescent. Several people were instrumental in reawakening the institution and turning it toward its present course. In 1976 young botanist Rodney Engard, originally hired as a horticulturist, was pro-

moted to director. He established an education department, started a docent program, and began the Garden's winter holiday event, "Luminaria Night." The Board of Trustees evolved into a group with strong, active links to the community.

In 1979 Charles Huckins became the sixth director of the Botanical Garden, and with him came additional professionalism for the Garden as a museum and scientific institution. Huckins, holding a Ph.D. in botany from Cornell and coming here from the Missouri Botanical Garden, in 1983 led the Garden to accreditation by the American Association of Museums. That same year the Garden was admitted as the fifth beneficiary of COMPAS (Combined Metropolitan Phoenix Arts and Sciences, the Phoenix fund-raiser for community institutions). Dr. Huckins established new, professional policies and procedures. With its first IMS (Institute of Museum Services) conservation grant, the Garden transferred its collection data to computer files, and the library collection was re-cataloged into Library of Congress classifications.

Seventh director of the Garden was Frederick W. Shirley, a retired lieutenant colonel in the U.S. Army. During his administration the beautiful Rhuart Demonstration Garden was dedicated in the fall of 1984 to show visitors how attractive desert plants can be in the home landscape.

In 1985 the Garden became a founding member of the Center for Plant Conservation, a



photo by Jan Barstad

Dr. Howard Scott Gentry with an agave



photo by George Lindsay

Birdseye view as
Administration Building is
built in 1940

national consortium of botanical gardens and arboreta devoted to the identification and preservation of rare and endangered plant species.

Since the Garden's present executive director, Dr. Robert Breunig, came in 1985, the Garden has completed the *Plants and People of the Sonoran Desert Trail*, restored Webster Auditorium (now listed on the National Register of Historic Places) and added Ullman Terrace (dining and entertainment patio), renovated the core trail—now the Desert Discovery Trail—with expanded public interpretive displays, developed the Endicott Wildflower Beds, constructed the Fleischer Propagation Center, and built the water- and energy-efficient Desert House demonstration project.

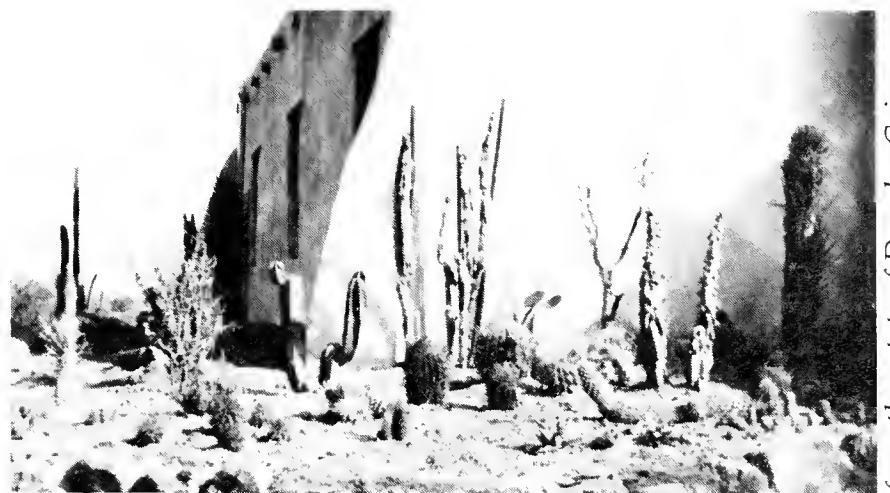
Among improvements, a new infrastructure

Under Dr. Breunig's administration the Garden has also developed a new infrastructure of water, sewer, and underground power lines as well as newly landscaped parking facilities and a new entry drive; expanded horticultural and research departments; created a public horticulture department; refined collection policies and upgraded collections' management; expanded its plant conservation program; increased public education programs, and developed long-term collection management strategies as well as programs for financial stability.

In the 1980s a number of scientists have become associated with the Garden while conduct-

ing research, including MacArthur Fellow Dr. Gary Nabhan, an enthnobotanist; Dr. Laura Jackson, research ecologist; Dr. Ted Anderson, research botanist and cactus specialist; Dr. Joe McAuliffe, research ecologist, and Wendy Hodgson (first associated with the Garden in the 1970s), research botanist and curator of the herbarium.

While many types of museums can come into existence rather suddenly—a building is created and collections are moved into it—a botanical garden quite literally requires time to grow. As the Desert Botanical Garden passes the mid-point of its sixth decade, its founders and the dedicated directors, staff, and members who have made its history can take pride in the institution's growth. Each stage of its development has proved to be timely and beneficial. The Garden can enter the twenty-first century not only with hope but with grace and distinction. ♦



from the estate of Douglas Cain

Early plants in front of Webster Auditorium

Someone to Know

George Lindsay, DBG's First Director

"Phoenix was such a lovely place in 1939," said George Lindsay. "There were between sixty and seventy-five thousand people living there. North Central Avenue was a beautiful avenue of palm trees and enormous homes. The desert was more nearly pristine in those days. And the botanical garden was such a nice idea, you know, to preserve the desert in Papago Park."

In May of that year, Lindsay, then twenty-two years old and already an explorer, collector and student of cacti, bowed to Gertrude Webster's persistent shower of invitations to become the first director of the Desert Botanical Garden. He went on to become a major figure in botany and museums. But his job in 1939 was to build and plant a 306-acre garden.

With plans drawn by Los Angeles landscape architect Charles Gibbs Adams and the help of about a score of Hispanic and Anglo boys employed in the National Youth Administration, Lindsay laid out the main trail, carried in granite boulders to make garden beds, trucked in tons of



George Lindsay (left) and Robert Hoard on an overland trip the length of the Baja California peninsula, July 1938.



topsoil and mulch to enrich the soil, attacked the underlying caliche.

He also planted thousands of cactuses around Webster Auditorium which have grown into the lush cactus "forest" of today.

"I was very young," Dr. Lindsay recalls about facing the project. "I didn't even have my bachelor's degree. It was initially challenging, but I didn't take it too seriously. Adams did the initial planning of the grounds. Local architects had done the planning for the administration building (now Webster Auditorium). I was not responsible for the building. My responsibility was to plant the garden.

"They were exciting times. I remember getting the vigas (pine logs) from northern Arizona. The architect dis-accepted some that were not right, and some new ones were brought in on trucks. We used the old ones for delineating the parking lot.

"We did the planting, designing, and building of the major pathways in the Garden. Adams had plans for things like rock walls with cactus growing in them—some things that we knew just don't work in the desert." The rock for those walls became the distinctive rock borders which still line the Garden paths.

"We hauled truckloads of soil from what is now McCormick Ranch in Scottsdale. Scottsdale was nothing then—a lumberyard, grocery store, Chinese restaurant, and Standard Oil station. We would do our work and then go over there for lunch."

Lindsay and his workers planted cacti donated by Gustaf Starck and by Mrs. Webster, Joshua trees salvaged from Congress Junction by Douglas Cain (Mrs. Webster's chief gardener) and Garden members, organ pipe cuttings and barrel

cacti from Ajo. He moved his own cactus collection here from southern California. He loaded a saguaro on the Garden truck and took it to the Huntington Botanical Garden where his friend, the director, William Hertrick, invited him to choose a truckload of plants to bring back to the new garden in Phoenix. Other plants were donated by cactus dealers in Southern California. And in the summer of 1939 he took the Garden truck down into Baja, Mexico, and brought back (with permits and approvals from Mexico and the U.S.) the cardons, boojums, and other cacti which have become the magnificent wonders outside of Webster Auditorium.

He and his crew planted over five thousand native cacti and other plants during the Garden's first months, the goal being to plant them in their

"...Visitors asked if anything had been planted yet. . .while standing. . .(where) plants had been moved during the previous two months."

natural groupings and associations. "The success of this 'naturalistic' type of planting was proven," Lindsay wrote in his annual report, "when visitors asked if anything had been planted yet. . .while they were standing in an area into which several thousand plants had been moved during the previous two months!"

How does he feel when he looks at those giants which he planted nearly fifty-five years ago? "A year or so ago when the IOS (International Organization for Succulent Plant Study) Congress was here and so many people—scientists—came from all over the world, I was thinking of Mrs. Webster's dream of housing a scientific garden here. It has taken a long time, and there were hard times, especially during the War, but finally now the place has blossomed. It is very gratifying."

Lindsay stayed as director only one year. He intended to return to his lemon ranch and botany studies in California, but Pearl Harbor and World War II intervened. After serving in photo-intelligence in the Army Air Force, he continued his field

trips and cactus-hunting exploration and in 1949 was named a Fellow by the Cactus and Succulent Society of America for his botanical explorations, descriptions of new taxa and many publications. In 1951 he completed his undergraduate botany work at Stanford and by 1955 had earned a Ph.D. with a dissertation on *Ferocactus*. In 1957 he became director of the San Diego Natural History Museum until 1963 when he became director of the California Academy of Sciences in San Francisco, retiring in 1982.

Dr. Lindsay named and described eighteen species of cacti. His own name is honored by fellow scientists in the names of seven cactuses as well as those of a scorpion and a blind snake. — Carol Schatt ♦



photo by Carol Schatt

Autograph Party for Judy

A reception honoring Judy Mielke, author of *Native Plants for Southwestern Landscapes*, published by University of Texas Press, will be held from 5 to 8 p.m. on Friday, March 25, in Richter Library at the Garden. The author, formerly senior horticulturist at the Desert Botanical Garden, will sign copies of her book.

She will also sign books on Saturday, March 26 from 9 a.m. to noon in the Plant Sale Yard.

Copies of the book will be available for purchase at both autograph locations and also in the Gift Shop. ♦

The First Plant Is Still Here; Bed System Has Grown Around It

The first plant transplanted and accessioned into the Desert Botanical Garden lives still. Its name is *Stenocereus eruca*; its number is 1939 0001 01 01.

It may have crept around a bit in the bed, however, remaining true to its common name which is "creeping devil." Indeed, George Lindsay, planting it fifty-five years ago, said it could "crawl over rocks or other obstacles in its way." No doubt it has. Most of it remains in bed #14, just outside of Webster Auditorium; but another specimen grows just across the walk in bed #16.

In fact, what are now known as beds #11 through 18A on the sloping land to the northwest of Webster, were the original planting beds in 1939. Wrested out of granite boulders and caliche, lined with rocks trucked in from Camelback Mountain, and enriched with soil from what is now McCormick Ranch, the beds in the core garden—the area traversed by the main trail—still contain many of the original plants.

The ravages of time—abuse and neglect during World War II (although volunteers with Director Charles Fleming devoted their own gas rations to visit the closed Garden and water the plants)—and the ripenings of time, in which plants have matured and completed their life cycles, have taken many of the more-than-five thousand plants originally planted in 1939.

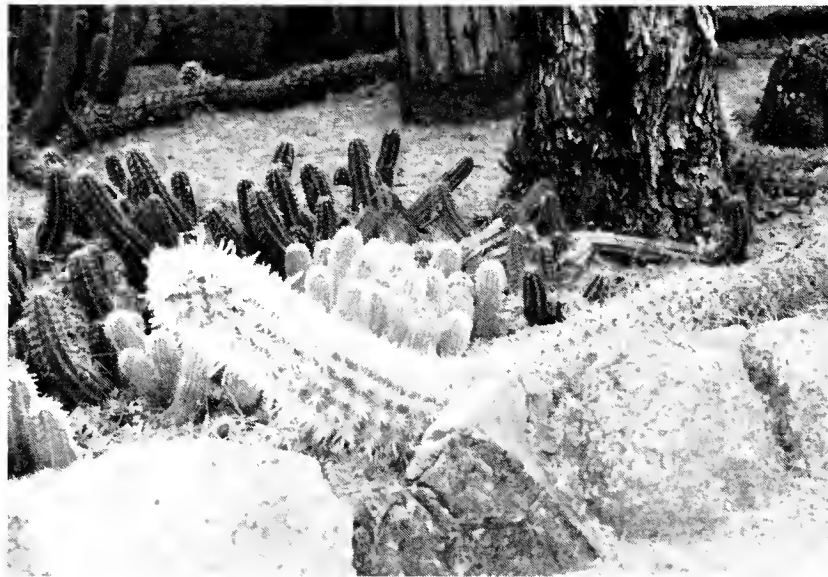
A surprising number remain, however, among the 20,000 plants in 3,800 taxa (species) which Starr Urbatsch, plant registrar, has filed in the Garden's plant records, now in computerized listing. Starr and her volunteer helpers—Bill Van Loo, Sandy Cielaszyk, and Ann Brown, along with Barbara Hofflander, who enters the data into the computer—have been three years in the Garden's beds with tape measures, pencils and maps, completing the computerization project begun earlier by Victor Gass, former curator of living collections.

They now know exactly where each plant is located in the Garden, and have mapped all but the Arizona Native Plant Trail and the *Plants and People of the Sonoran Desert Trail*.

In the year 1992 a record number of plants and seed types were accessioned, Starr said, which was 1,500. During last year, 1993, there were 1,047 new plants and seeds accessioned. She said 414 plants were accessioned in 1939.

The accession numbers include twelve digits. Remember the number of our old friend, the creeping devil: 1939 0001 01 01? The first four digits, 1939, are the year in which the plant was accessioned into the Garden records. The middle four

digits, 0001, reflect the sequence of this particular plant among all other plants accessioned that year. The next two numbers, 01, are a two-digit code indicating that this genetic individual came into the Garden as a plant; the code "10" means the individual was a seed, and "02" means it came as a cutting. The final two digits, also 01, mean this specimen



was plant number one under the preceding umbrella information. That preceding information, Starr said, is like a family name while the last two numbers are the individual's own name.

About a hundred or so beds compose the Garden's bed system. They are the organizing framework for the collection because plants are grouped in the beds mostly by genus or by geographical origin.

"Every bed has a meaning," said César Mazier, superintendent of horticulture, "and that may be that plants in one bed are of the same genus or from the same area of the world."

For example, there are aloe beds, agave beds, opuntia beds, mammillaria beds, as well as beds of plants from Baja, South America, Australia,

(Please turn to page 15)



In Print

Early Book Shines as History of Collection And Window into Director's Character

By Jane B. Cole

Arizona's Cactuses, Science Bulletin No. 1

By W. Taylor Marshall

111 pp. Tempe: The Desert Botanical Garden of Arizona, 1950.

This book, the first published by the Desert Botanical Garden, was developed by Bill Marshall as a field guide for members of the Garden. Marshall, president of the Arizona Cactus and Native Flora Society and director of the Desert Botanical Garden of Arizona, hoped it would fill the gap since the publication of Lyman Benson's book (*The Cacti of Arizona*) before World War II.

Marshall, a Fellow of the Cactus and Succulent Society of America, was a great admirer of Benson, and used many of the species names and descriptions that Dr. Benson suggested. That is one of the strengths of *Arizona's Cactuses*. Another noteworthy factor is the insight that his book offers into the character of Bill Marshall. And, for the 1990s Garden research and horticultural staff the book provides valuable data on the Garden's living collection. We are able to substantiate who brought these plants into the Garden, from where, and where they were planted.

Bill Marshall was an educator trying to interpret scholarly information to the general public. He was impatient with some of the scholarly traditions and said so. The title of this book, *Arizona's Cactuses*, illustrates one of his concerns, that this American family needed an anglicized name. It should be "cactuses" rather than "cacti" just as we say "roses," not "rosae."

The excerpts of Garden cactus expeditions are now historical and fascinating, and some of the photos in the book show plantings in the Desert

Botanical Garden, alive and well. One plant, *Neovansia diguetii* (syn. *Peniocereus striatus*), is described as "collected by Mr. and Mrs. Emil Bien of Tucson under special permit of the Papago Tribal Council, Mr. Thomas Segundo, Chairman of the Council, Papago Reservation." With this information in hand, it might be possible to trace descendants of all concerned (plants and people).

Marshall's book describes a little mammillaria, *Mammillaria wrightii*, as collected "near Springerville, Apache County, Desert Botanical Garden Expedition of 1948, Arizona State College Botany Class 1950." A search for both the native population and the Garden collection would be interesting.

Great fun to read are Marshall's running comments on the process of naming plants: "(W)e fail to understand why Mr. Peebles in May 1950 accepted *Opuntia kunzei* as a valid species and referred *Opuntia wrightiana* to it." Marshall sounds peevish, but, as Dr. Ted Anderson of our present-day research staff points out, in 1950 there were not that many people working with these spiny plants. Mr. Marshall, Dr. Lyman Benson, Mrs. Lucretia Breazeale Hamilton, Dr. Nathaniel Britton, and Dr. Joseph Rose were pretty much alone in the field in the United States, with Dr. Helia Bravo in Mexico.

Marshall was doing everything: raising money for the Garden, going on collecting trips, organizing the plantings in the Garden, and giving lectures and slide shows in Webster Auditorium. There were only three people on the staff at that time, and Marshall's wife served as a volunteer bookshop salesperson. The Garden benefited from all these activities. Every plant that Mr. Marshall found on his field trips went into the collection.

This is a wonderful little book. Garden history buffs will enjoy it and it is still a usable field guide to Arizona's cactuses. Photos are in black and white. Copies are sometimes available in used-book stores for about \$10.00. (The price of a copy in 1951 was \$1.85.) ♦

(Jane Cole is the Garden librarian. Richter Library is available on weekdays to Garden visitors and for phone reference at (602) 941-1225.)



Desert Gardener

Southwestern Patios Trace a Gardening Lineage Back to Ancient Desert Cultures

By Mary F. Irish

As I find out more about gardens in other desert regions, I am struck by the differences in gardening among such similar areas. These differences include much more than just plant choices. Desert gardeners of the Old World, whose traditions reach back to just after the fall of the Roman Empire, have evolved techniques and styles radically different from ours, but from which we have much to learn.

In the American West, gardeners increasingly pay homage to the natural world around them, both in design and plant choice. Interest in native plants, naturalistic plantings, and a casual lifestyle create gardens which are admired for their random, natural appearance and gentle fit with the surrounding landscape.

Gardeners in the older deserts—those of Asia and of the Arab world—consider gardens to be a glimpse into paradise. Rather than imitating the natural world, these gardens are havens, places of solitude and repose. Plants are selected for scent, color, and symmetry. These gardens are usually built within a wall, defined with pavement, and complemented with fountains. They are perhaps the ultimate urban design.

Both of these gardening traditions share one significant feature: The gardens are meant to be lived in, used, visited and enjoyed, often as extensions of the rooms of the house itself. Modern desert gardens echo their ancient desert heritage in their use of small spaces, such as patios.

Patios embrace us, shut out the world

Small enclosed gardens or patio areas have a number of special characteristics. Walls usually sur-

round them, cutting off views and vistas. In ancient gardens this protected against noise, dust, and animals and increased a sense of privacy and repose. Our interest in privacy and repose is no different.

These small, tight spaces make plant choice critical. Variety and interest rests heavily on the plant combinations. When deciding on plants, look for combinations with different types of leaves: soft/hard, small/large, or lacy/flat; or size: tall/short, columnar/billowing; and color: lots and lots of color.

Mixed plantings of the numerous red and blue salvias (*Salvia coccinea*, *S. greggii*, *S. leucantha*), rock penstemon (*Penstemon baccharifolius*) for nearly year-round color, and *P. parryi*, *P. eatonii*, and *P. pseudospectabilis* for seasonal color are a feast both for our eyes and the hummingbirds so welcome in any garden. *Plumbago scandens* with its clear white flowers in summer and rusty red foliage in winter gives a changing color scheme through the year. Medium-sized and small agaves (*Agave attenuata*, *A. parviflora*) blend well with small colorful perennials or look handsome in containers. Small aloes and the ground-hugging mesembs (*Lampranthus spectabilis*, *Drosanthemum* spp. or *Malephora crocea*)



photo by Carol Schatt

Many of the elements for a successful patio are used at Archer House Patio: low walls, shade and shadows, container and in-ground plants of texture and color.

provide interesting succulent leaves as well as winter color.

While walls certainly frame and define the garden, they can also impart to it the impression of a container, particularly if they are tall. Relieve this claustrophobic effect by covering the walls with vines and by using plants which draw your eye to them. Wall covers such as bougainvillea (*Bougainvillea* sp.), podranea (*Podranea rico-soleana*), coral vine (*Antigonon leptopus*) and yellow orchid vine (*Mascagnia macroptera*) are particularly lovely.

Dense shrubs like hopbush (*Dodonea viscosa*) or jojoba (*Simmondsia chinensis*) mask walls and create a hard green background for a more colorful planting. In ancient gardens, myrtle (*Myrtus communis*), laurel (*Laurus nobilis*), and citrus were used for this purpose. There they were often pruned quite formally, a practice to which many desert shrubs lend themselves.

Blend in shrubs with lighter-colored foliage such as brittlebush (*Encelia farinosa*), four-wing salt bush (*Atriplex canescens*), or Russian sage (*Perovskia atriplicifolia*). Use plants such as the lovely twisted leaf yucca (*Yucca rupicola*) or crown of thorns (*Euphorbia milii*) for interest in a small garden. Combinations are endless, and planting closely will magnify their impact.

The sound of water adds sensory delight

In Old World desert gardens, water—especially moving water—is the critical element in the design. The sound of water is seductive, veiling outside sound and further enhancing the garden as a soothing retreat. Small drips, falls or fountains create sound as well as a focal point for any small garden. The movement of water in such a garden setting should not be powerful or dynamic, but careful and deliberate, emphasizing the garden as a place that is restful, calming, suitable for contemplative thought.

In this Salt River Valley, as in all desert areas, shade makes a garden comfortable. Trees always give a garden structure and vertical definition, but a small garden can rarely accommodate mesquite or palo-verdes. Look instead for small trees for these areas. Texas ebony (*Pithecellobium*

flexicaule), and its rare cousin *P. pallens*, kidneywood (*Eysenhardtia orthocarpa*), desert fern (*Lysiloma thornberi*), guajillo (*Acacia berlandieri*) are but a few to complement a small place.

Patios and small gardens offer great opportunities to use dramatic container-grown plants. Both the pot and the plant contribute ambiance and interest to a small garden. Container-grown plants are easy to care for, and can be of any size which is appropriate. Archer House Patio at the Desert Botanical Garden is small but offers a wonderful view of the Rhuart Demonstration Garden. The patio is “planted” extensively with container-grown desert plants including grasses, succulents and small trees.

Desert gardening recognizes an ancient heritage, and from that long experience offers some of the most delightful and satisfying solutions to the dilemmas of gardening in the dry places. Look for these old techniques in mission courtyards such as Tumacacori in southern Arizona, in the informality of our Garden’s Eliot Patio, or outside your own glass door.◇

(Mary Irish, our Desert Gardener, is director of public horticulture at the Garden.)

Spring Plant Sale in Late March

The Garden’s sixteenth annual Spring Plant Sale will be held the last weekend of March and will feature small wildflowers in flats and well as plants being newly introduced to home horticulture.

Over three hundred species of desert plants, including herbs, cacti, agaves, trees, shrubs, vines, and groundcovers, will be available at the sale, according to Mary Irish, who is in charge of the sale.

The sale is open on Friday, March 25, **for members only**, from 3 to 6 p.m. On Saturday, March 26, it is open **for members only** from 8 to 9 a.m., and to the public from 9 a.m. to 5 p.m. On Sunday, March 27, it is open to the public from 9 a.m. to 5 p.m.◇



Plant Profile

A Giant for Your Garden

Pachycereus pringlei
Cardon

When I walk through the Garden with companions from other botanical gardens, they often remark that it is enviable to work in an old collection. Near Webster Auditorium where our great giants hover over the Garden, the grace and character of an older garden are particularly evident. Here are the plants which represent our beginning: the creeping devil (*Stenocereus eruca*), the boojum (*Fouquieria columnaris*), and the cardon (*Pachycereus pringlei*).

The cardons are so commanding that few visitors can leave the area without a picture memento. In fact, the Garden recently widened the path nearby to enable visitors to satisfy their photographic itch without the danger of involuntary scratches.

The first director of the Garden, Dr. George Lindsay, tells a story of his trips into Mexico to begin the collections of the Desert Botanical Garden. Funds were limited, and so was space; thus it required imagination to bring back plants sufficient to make an impression. Refrigerator boxes, about six feet tall, were available and it was in those boxes that Lindsay and his companions brought back the cardons which stand beside Webster Auditorium today.

Cardons belong to the genus *Pachycereus*, which is native to Mexico from Sonora to Yucatan. Cardons occur naturally in large forest stands in Sonora and in lower Baja California. There are about ten species in all, but only two are commonly available, *Pachycereus pringlei* (cardon) and *P. pectin-aboriginum* (bearded cardon), remarkable chiefly for its astounding fruit. Fruit capsules are round, the

Garden member Kate Ellison and her granddaughter Lucy and Ann Gully, also a Garden member, admire a huge *Pachycereus*.



photo by Carol Schatt

size of a baseball, with long, stiff, dark bristles.

All members of *Pachycereus* are huge, but the name is derived from the Greek *pachy*, meaning "thick" and the Latin *cereus*, referring to a candle shape. Cardons, also known commonly as elephant cactus, differ from saguaros in many spine and flower characteristics; they have a distinctive habit of branching prolifically and much lower than saguaros do. The stems appear to arise from a "foot."

Cardon is thought to be somewhat frost sensitive, although data is sparse; however, frost is more of a problem for small plants than larger ones. Cardon blooms are white, occurring in the summer and riding up and down the spines near the top. They develop into fuzzy, round, golden fruit. Old reports claim that the large seeds were ground into a flour.

Unfortunately, most desert gardeners neglect the large cacti—tree-like *Trichocereus*, cardons and their relatives, even the relatively common *Myrtillocactus geometrizans* with its delicious edible fruit. But these plants can become masterpieces in a garden large enough to accommodate them. Most are faster growing than you would expect, and can take moderate pruning to keep them in good shape. All grow better with regular, deep irrigation during the hottest summer months.

Next time you find yourself walking by Webster Auditorium, think of George Lindsay, standing in a forest of these stately giants, selecting those perfect young plants to start the collection of which we are such proud caretakers today. And then consider how the young plants which we set out this year and the next will look to succeeding desert gardeners in the coming fifty-five years. — Mary F. Irish ♦

Around the Grounds

Five-Year Study Looks at Wildflower Problems

By Chuck Smith

A five-year study of horticultural problems associated with growing wildflowers is underway at the Desert Botanical Garden and will include:

- herbicides and weed control techniques;
- planting season versus germination results by species;
- temperature requirements for germination;
- effect of fertilizers on wildflower density;
- effects of various bird-control measures; and
- light requirements of various wildflower species.

The research, begun last fall, is funded by a special grant from Brad Endicott, a member of the Garden's Board of Trustees, in memory of his late wife Birte. Results of the testing will be reported in *The Sonoran Quarterly*.

César Mazier, the Garden's superintendent of horticulture, designed a study being conducted during this wildflower growing season to discover the most effective method of controlling grass, a

The effects of herbicides on wildflower growth are under study in these mini-beds, which show varying amounts of grass germination among the wildflowers. The central pathway of grass sprouted in the absence of herbicide. White covering rolled aside is to protect seedlings from birds.



main competitor with wildflowers. César is specifically studying the impact of various herbicides on grasses such as *Schismus barbatus*, one of the dominant species at the Desert Botanical Garden. The effect of herbicide-use will be monitored in both the spring and summer wildflower growing seasons.

The white covering placed over the Birte Endicott Memorial Wildflower Garden protects seeds and sprouts from the birds, César explained. ♦

(Chuck Smith is the Garden's director of community relations.)

(CONTINUED from page 10)

and the Chihuahuan Desert, to name a few.

"Some beds became a hodge-podge because in the early times planting was a little different. It was a display, an exhibition of the collection, so sometimes plants seemed to be planted without a much of a system," he said.

Beds were first assigned numbers when the earliest mapping and serious organization of the collection began in the late 1960s under the administration of Hubert Earle, according to Victor, who joined the Garden staff in 1976. Botanist Rodney

Engard, who later became director of the Garden, prepared the first map of the Garden's collection at about the same time Sherry Crouch Krummen of the 1970s education department was developing records on the collection.

In 1990 Ruth Greenhouse of the Garden's education department and Judy Mielke, then a senior horticulturist on the staff, evaluated the garden beds to produce a working document called "Garden Beds and Exhibits Reference Manual." This manual has been helpful in relocating plants into appropriate groupings, an ongoing project for the horticulture department.—Carol Schatt ♦

Charitable Trust Has Benefits For Both Donor and Garden

By Melissa A. Kemp

Occasionally an opportunity is presented which just seems too good to be true. The charitable trust fits this category. It creates situations in which everyone benefits. This is good news for people interested in preserving a secure financial future for themselves and especially for those also interested in a secure future for their charitable causes.

Charitable Trust Reduces Taxes

The charitable remainder trust benefits you and the charity. This device, approved by the IRS, creates an income tax deduction, and avoids the tax on any potential capital gain. It can also provide an income and is not taxed in your estate at your death.

The most popular assets contributed to such trusts are assets acquired at low cost that now have a high value. Upon their sale, the difference between the original cost and higher sale price would ordinarily result in a significant taxable capital gain, perhaps producing enough of an increase in tax to cause an individual to be reluctant to sell.

The gift of these assets, however, to a charitable trust will not trigger the tax, nor will it apply when the charity sells the asset. It produces for the donor a tax deduction for the gift **plus** the avoidance of capital gains tax. The deduction amount varies with the income payout and the number and ages of income beneficiaries.

Trust Increases Income for Life

Sometimes the assets you are considering for your donation produce little or no income. With a charitable remainder trust you select an income amount which you would like to receive. The trustee of your charitable trust will reinvest your gift in investments designed to preserve the principal as much as possible while producing this income. The trust can be structured to continue

paying income for your life and those of other beneficiaries.

Trust Avoids Estate Tax

The federal estate tax starts at about 40 percent and increases to 55 percent for estate assets subject to the tax. Gifts made to a charity escape this tax. Significant savings in death taxation result from strategic use of charitable trusts. And if you desire, there are ways to replace assets for your heirs outside the estate tax system.

The Opportunity Exists

No income tax on capital gains, an income tax deduction for charitable giving, no death tax, increased income during your lifetime, and the good feelings derived from supporting a cause like the Desert Botanical Garden are reasons enough for our donors to learn more about the charitable trust. Our development department has a team of experts donating their time and talents to help answer your questions. Call Sherry New at 941-1225 if you would like to receive more information about this concept. ♦

(Melissa A. Kemp is vice president of M&I Marshall & Ilsley Trust Company of Arizona and a member of the Garden's Planned Giving Committee.)

Group Honors Dr. Huizingh

Dr. William Huizingh, president of the Garden's Board of Trustees, was recently presented the Spirit of Philanthropy Award by the Greater Arizona Chapter of the National Society of Fund Raising Executives.

The award was given in recognition of Dr. Huizingh's outstanding work and dedication on behalf of the Garden. He has been a member of the board for six years.

Dr. Huizingh is a retired accounting professor from Arizona State University where he also was a department chairman and associate dean. ♦

If you have an item you believe would be useful, please call the Garden at 941-1225 for more information.



WISH LIST

- Comfortable folding chair
- TV tray
- Mug rack
- Metal detector
- 50 meter measuring tape
- 386 computer
- Desktop copy machine
- Heavy-duty blender
- Portable tape player
- The American Midland Naturalist*
 - 1942: Vol. 27, #2 & 3
 - 1943: Vol. 29, #1, 2, & 3
- Oscillating fans
- Shallow display baskets without handles
- Garden storage shed at least 8' x 10'
- Fireproof safe or filing cabinet
- Craft-size mail boxes
- Publication-quality 35 mm camera with flash
- Four-drawer filing cabinet

Thanks to these members for their generous response to last quarter's "Wish List"!

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- Kirti Mathura - low-heat glue gun
- Carol Ruppe - oscillating fan
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- B. & Adele Swan - two-drawer filing cabinets
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The Desert Botanical Garden wishes to acknowledge the support of all of its 6,500 members. Recognized in the *Quarterly* are members of the President's Club, Director's Circle, Saguaro Society, Ocotillo Club, Agave Century Club, Desert Council and donations received from October 1, 1993, through December 31, 1993.

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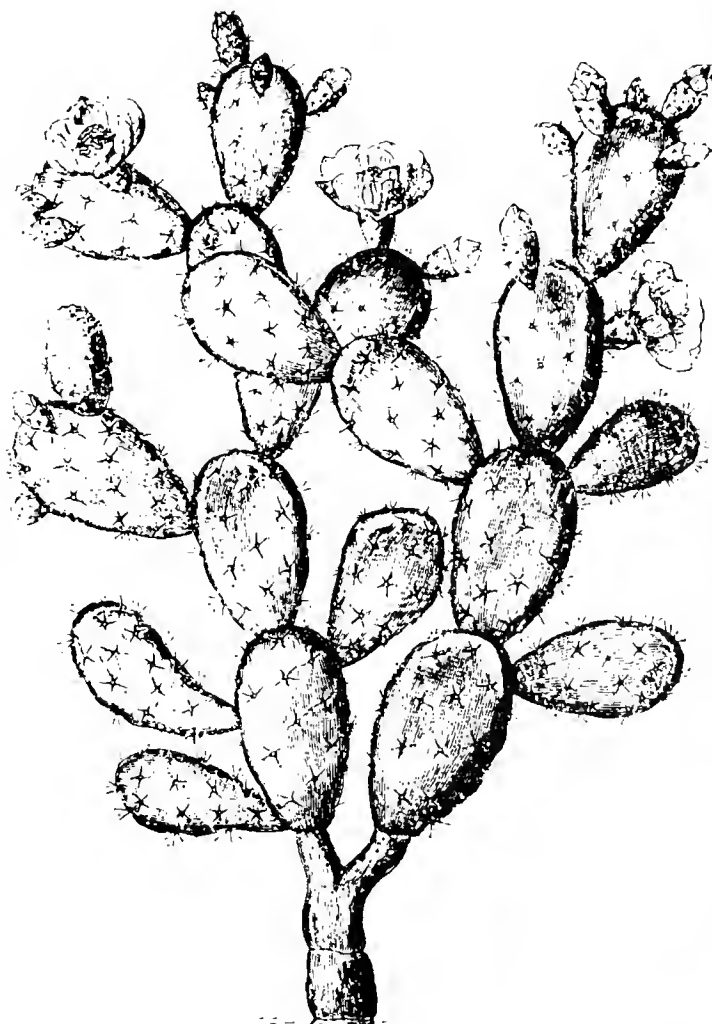
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Elegant Evening in Store

Friends and members of the Desert Botanical Garden are invited to enjoy an evening of gourmet dining and dancing under the stars in honor of their favorite non-profit institution on Saturday, April 16.

The event, the eighth annual Dinner on the Desert, is co-chaired by William Shover of Phoenix Newspapers, Inc., Scott Jacobson of Arizona Public Service Company, and Scottsdale City Councilwoman Sam Campana.

The evening will begin with cocktails at 6:30 p.m., served along the Garden's recently lighted and brick-paved Desert Discovery Trail. A sale of potted, unusual, desert plant specimens will begin in Webster Auditorium also at 6:30 p.m.

Dinner will be served on Ullman Terrace, with dancing and live entertainment following. Cost of the event is \$150 per person, and reservations may be made by telephoning the Garden at 941-1225.◇

Special Events Calendar

Music in the Garden

Sundays, March 6 through April 24
11:30 a.m. - 1:00 p.m.

Spring Plant Sale

Members' day, Friday, March 25;
open to public
Saturday and Sunday,
March 26 - 27

Dinner on the Desert

Saturday, April 16

"Desert Bloom"

Fourth Annual Landscape and Garden Show
Friday, Saturday & Sunday,
April 22, 23 & 24
9:00 a.m. - 6:00 p.m.

Mothers' Day

Sunday, May 8
Mothers admitted free

Greenhouse Closeout Sale

Saturday through Tuesday,
May 28 - 31

Wildflower Hotline:

The Garden's Wildflower Hotline will be available March 1 to April 30 to let Arizona residents and visitors know where wildflowers are in bloom throughout the state.

This popular harbinger of spring is a taped message, updated once a week, and available twenty-four hours a day.

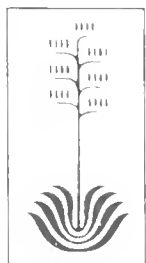
The number to call is 481-8134.◇



The Sonoran Quarterly
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June - August 1994/Volume 48, No. 2



THE GARDEN AT NIGHT:
SUMMERTIME ACTIVITIES
Pages 4-5



By Robert Breunig

So, why are plants important? This question was posed to me recently. At first I was shocked. How could anyone be so naive. All of our docents and teaching staff have amusing tales about people who don't realize that fruit is the product of flowering, that blooming is a widespread phenomenon in plants, or that plants are alive. While good for a laugh, these anecdotes point to a sadder truth; ordinary knowledge about the life of plants and the web they weave over all other life is missing. Every lost species, every degraded landscape, and every threatened ecosystem is a stark reminder of this ignorance. Therefore, it struck me that this question might represent the heart of the mission of the Garden, just as plants define the heart of life on this earth.

Plants are the very foundation of life here on earth. Plants maintain the balance and availability of oxygen in the atmosphere upon which all animal's live. Water molecules released from plants continue the cycle of cloud formation which ultimately results in the earth's fresh water. This infusion of fresh water replenishes life which creates and sustains the great river systems throughout the world.

The death of any plant results in a release of a crazy quilt of nutrients and minerals, particularly carbon, sustaining the global cycle of carbon dioxide formation so crucial to life. Leaf litter decays to transform the crushed minerals of the earth into soil.

Plants enable the continuance of all animal life. Without the plants there are no plant eaters, without the plant eaters there is no food for the animal eaters, and once you have dispensed with all three common elements of the chain, the chain no longer exists.

As the 20th century proceeds, more and more people in this country are raised in a city. It is becoming clear that generation after generation could grow to adulthood without any sense of the place in which they live. Fewer children explore

back lots, farm fields, or gardens to find out about other life; they find out most of what they know from books or television. As

opportunities for directly experiencing the natural world shrink, knowledge built on exploration and observation becomes increasingly rare.

Schools need help. Few can offer programs or studies in the life of plants, botany, or horticulture. That is why I feel that it is here, in the information, appreciation and understanding of plants and their place in the continuum of life, that the Garden finds its most rewarding place in the community.

In 1939 when the Garden was founded, it was in response to the founders' concerns about the loss of desert land to development. They wanted the citizens of the emerging city of Phoenix to have a place where the life of the desert, and particularly its plants, would be displayed, discussed, researched and conserved. They articulated these interests in the mission of the Garden, and we find ourselves in a time when that mission is as critical now as it was then. Through the Garden's education and outreach, through its research and conservation efforts, through the display of the astounding variations of desert plants, the Garden offers our community a wealth of opportunities to learn the wonder and nature of plant life.

But perhaps more than anything, the Garden offers a place where you can carefully see; where it is possible to watch a moth pollinate an agave, or a tortoise stained from an orgy on cactus fruit cross your path, or spy on the careful clearing of plant litter by a lizard looking for a bug lunch. Summer is a lively time at the Garden, I invite you to come and visit, take your time, and see what kinds of lessons in the life of plants you can discover for yourself.



photo by Elliott Lincis

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ABOUT THE COVER:

A delightful and varied schedule of activities will make the Desert Botanical Garden an important summer after-dark destination where members and visitors can enjoy cooler temperatures and see the Garden in a new light—the dramatic and soft illumination of night lighting.
Cover photo by David H. Smith



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THE SONORAN QUARTERLY JUNE - AUGUST 1994/VOLUME 48, NO. 2

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Designer: Andrew Schatt



See the New Garden this Summer...

By Chuck Smith
Photos by David H. Smith

The peace and quiet of the Sonoran Desert at night; sounds of Gambel's Quail scurrying to lose themselves within the shrubs; glimpses of lizards darting over the paths; all surrounded by pungent waves of creosote and the rounded and jagged silhouettes of the Papago Buttes...pleasures you can only experience in the summer and only after the sun sets!

Last year, with the help of a grant from the City of Scottsdale's Hospitality Commission, the Desert Botanical Garden installed lighting along the main trail - the Desert Discovery Trail. Nearly 30 lamps reflect a gentle wash of light from their petals. Two hundred "up-lights" focus on selected specimen plants and trees in the core garden. A recent private donation funded the installation of 200 more up-lights along the trail, enhancing the over-all nighttime experience.

The \$160,500 grant was the result of a study the Hospitality Commission conducted among Scottsdale's summer visitors, many of whom are international visitors here for a day or two who don't have enough time to see all they want to during daylight hours. With the Garden open at night, Commission members thought, visitors might be willing to extend their stay a half to a full day and have a positive economic impact on local businesses.

Shade areas, benches and cool water fountains now line the Desert Discovery Trail, inviting you to soak in the beauty of the Garden at night.

The quarter-mile brick paved main trail encloses the Garden's world-renowned collection of thousands of desert plants from Africa, South and

Central America, Baja California and the Sonoran and Chihuahuan Deserts.

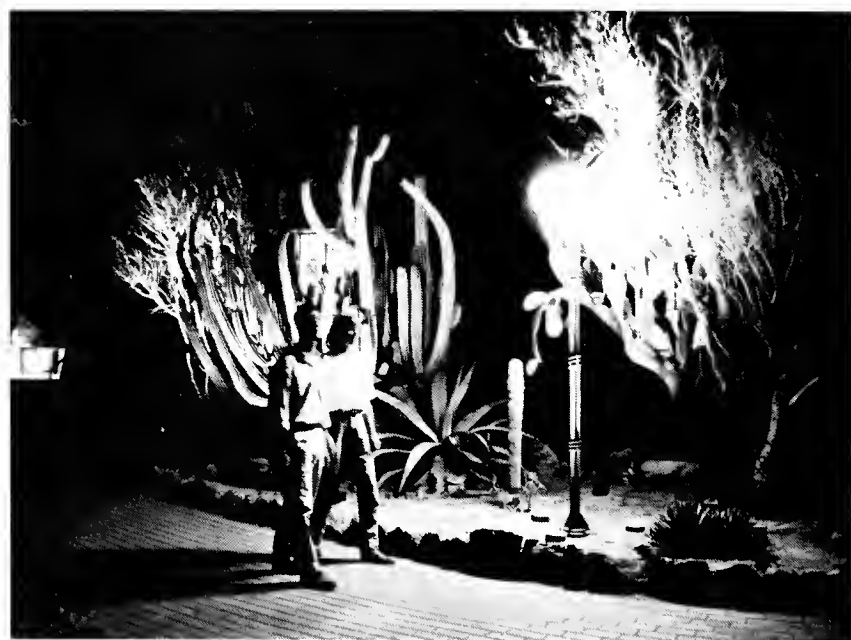
Plans for nighttime programming are being finalized. The highlight of the summer experience at the Garden is the Desert Moonlight Tour held on June 6 and 13, July 19 and 25 and August 16th and 22 - all beginning at 7 p.m. Docent-led tours through the Garden provide an opportunity to explore how plants and animals are adapted to life in the Sonoran Desert. Dr. Michael Plagens from

the County Health Department explores from a remote station the desert's diverse nighttime insect life.

You can combine a nighttime visit to the Garden with enrollment in one of several classes offered by the Garden. Advance registration is required and class size is limited. To find out about class fees and enrollment, call the Garden between 8

a.m. and 5 p.m. Monday through Friday at 941-1225. Among the classes offered are:

"Southwest Desert Landscaping: A Basic and Practical Environmental Approach," taught by Ron



...In a Dramatic and Different Light!

Dinchak on June 7, 9, 14, 16 and 21 from 6:30 to 9:30 p.m.

If you want to really "focus" on our plants and wildlife at night, enroll in *"Summer Evenings in the Desert - Twilight and Nighttime Photography"* taught by John Nemerovski on June 8, 15, 22, and 29 from 7 to 10 p.m. John uses a lecture/photo-outing approach that offers excellent opportunities to take



advantage of the lighted plants.

"Drip Irrigation: A Water Conservation Strategy" taught by Andrew Terrey on June 23 from 7 to 9 p.m.; *"The Care and Cultivation of Agaves"* taught by Mary Irish 6:30 to 8:30 p.m. on June 6 and *"A Newcomer's Workshop in Desert Gardening"* also taught by Mary Irish on July 13 from 6:30 to 8:30 p.m.; *"An Introduction to Plant Propagation"* taught by Kirti Matura on July 20 from 6:30 to 8:30 p.m. and on Saturday, August 20 from 7 to 11 a.m. are other opportunities.

There are other ideas in various stages of development including an intimate summer nighttime musical program in the amphitheater. You might find botanically inspired hors d'oeuvres on Ullman Terrace along with cool drinks, beer, wine, or saguaro yogurt to refresh you. You might be able to do a little star gazing through large telescopes, and enjoy staff presentations on various topics and



musical entertainment.

Early-morning activities such as bird walks continue through the summer. Walks are on Monday mornings at 7 a.m., beginning at the Garden Admission's Booth.

After visiting the Garden this summer, take a few minutes to jot down impressions about your nighttime visit. Staff and volunteers want to design programs that are of interest to Garden visitors, especially our members. Your likes and dislikes, joys and disappointments and suggestions for next season will contribute to an even greater nighttime experience!

Lights enable us to share so much more of what we have to offer with out-of-town guests, especially the numerous international visitors who named the Desert Botanical Garden as the place they most wanted to visit when in the Valley of the Sun. If you have friends, especially the many who live right here and who have never been to our Garden, invite them to join you on a special nighttime tour. You'll see the Garden like you've never seen it before.

Benson Collection a Treasure Trove for Garden Library

By Carol Schatt

A major botanist's collection of books, journals and papers has been given to the Desert Botanical Garden's Richter Library, and Jane Cole, Garden librarian, feels like she's looking through a treasure chest as she sorts through the cardboard boxes which hold Lyman Benson's collection.

Dr. Benson, who spent most of his professional life teaching at Pomona College of the Claremont Colleges in Claremont, California, did extensive work in cactus taxonomy. Among the books he wrote are three of botany's major reference books: *Plant Classification* (published in 1959), *The Cacti of the United States and Canada* (1982), and *Trees and Shrubs of the Southwestern Deserts* (published in 1945, revised in 1954 and 1981).

Dr. Benson's collected books and papers, which were given to the Garden by his sons, Robert and David, include the books and journals he used in botanical research; photographs which he took as well as botanical drawings which were used in the



Robert Breunig, director of the Garden, and Jane Cole, Garden librarian, look at drawings from the collection of Dr. Lyman Benson.

books and articles he wrote; drafts of his manuscripts, including one never published; and his correspondence.

Of great value to researchers at the Garden library will be Dr. Benson's numerous *floras* (treatises describing the plants of a region) from areas all over the globe.

Other treasures in the Benson collection include complete runs of journals such as *Leaflets of Western Botany*, published from 1932 to 1966. Until now, the Richter Library had only random issues of such journals and often had to find copies from other sources if Garden researchers needed those materials.

The collection contains seven copies of an uncompleted manuscript by Dr. Benson, entitled *Evolution of the Flora of North America*. The manuscripts include comments from fellow botanists whom Dr. Benson had asked to review the work. "He was working on it in the 1970s," Jane said, "before plate tectonics and theories of continental drift took hold and changed approaches to evolution."

"Dr. Benson stopped writing after his wife died in 1980," Jane said. "Looking at his manuscripts, which were typewritten—those were pre-word-processor days—you feel that she must have done much of the typing and pasting with her husband. He wrote at home so they may have worked together."

Among his letters is correspondence in which he suggested developing a wine industry based on the pear orchards of Kelseyville, California, the small agricultural community where he lived.

"The treasure hunt is in finding things and matching them up," said Jane, who said that sorting through the collection will require at least six months. In the collection are exquisitely beautiful botanical drawings by Lucretia Breazeale Hamilton. This widely-known botanical artist of Southwestern plants lived in Tucson, Arizona and was one of the founders of the Arizona Native Plant Society.

"There are lots of useful things for us in this collection," Jane said. "And there are even more

photo by Chuck Smith



Dr. Lyman Benson

boxes yet to open."

Going through Dr. Benson's books and letters offers a special glimpse into the mind of the botanist-writer-teacher, Jane said.

Dr. Benson's family looked at the botanical collection at the Huntington Library and also at Rancho Santa Ana Botanical Garden near Pomona College where Dr. Benson taught, before they presented their father's collection to the Desert Botanical Garden.

"Bob Benson was impressed with our program here. He felt confident that since we have an active research program going on, although our library is already very crowded, these materials will be looked at, used, and treasured. He's right," she said.

Dr. Ted Anderson, senior research botanist at the Garden, received his Ph.D. under Dr. Benson at Claremont Graduate School, and maintained a close, lifelong friendship with him. "I could not have hoped for a better graduate advisor and role model," said Dr. Anderson. "He was a great teacher and inspiration."

Parts of the collection will be exhibited as the Benson Collection, Jane said. "And there may be parts we don't keep.

"We recognize the value of the collection to

our research," she said, "and we also treasure the memory of Dr. Benson and value keeping the things significant to this great botanist."

Dr. Benson grew up on the family pear orchard farm at Kelseyville, near Napa Valley north of San Francisco. He greatly admired his great uncle, H.W. Benson, who was president of the California Audubon Society and wrote a column for the *Kelseyville Sun*. Lyman went to Stanford University to study journalism but soon switched to botany, obtaining in due course his Ph.D. He came to the University of Arizona and taught there for six years before moving to Pomona in 1944 for the rest of his career. He died in 1993.

He became a towering figure in American botany, which Jane describes this way: "If you said to a researcher, 'Have you checked Benson?', no one would think you are talking about someone else.

"There is Britton and Rose—the first description of The CACTACEAE—and then there's Benson, who wrote The Cacti of United States and Canada."

Jane, who brought the collection to Phoenix in February, will spend the next months looking through it and making decisions about how to incorporate it into the Richter Library. She said she will need to consult with conservators and archivists. For now, the collection is not available either to researchers or to the public. ♦

IMPORTANT MEMBER NOTICE

Do you have old Desert Botanical Garden reply envelopes with a post office box as the mailing address? If so, **THROW THEM AWAY!**

The box was closed a year ago and the forwarding order has expired. Any correspondence sent to that box after March 1994 will be returned to sender.

All correspondence should be sent to our street address: 1201 N. Galvin Parkway, Phoenix, AZ 85008-3490. ♦



Desert Gardener

Agaves: Natural and Dramatic

By Mary F. Irish

Not long ago I received a letter from a man in New York. He had just visited the Garden and had been frustrated in his attempts to find the origin of a rope he had owned and used as a young lariat thrower. He knew his rope as a "maguey lariat." No one that day could tell him what was a maguey plant, but it is an agave, maguey being a common term for agave especially in central Mexico. It had been over forty years since he had handled that rope, but his letter described the rope as if it were in his hands as he wrote. It must have been an outstanding rope.

It would be pleasant to think that everyone who encounters agaves retains such fond memories.

Agaves are too often depicted as bizarre or vicious, and any garden writer who has managed a few words on the plants has advised the gardener to leave himself plenty of room and keep children and pets at a distance, thus according agaves the status of a garden pariah. While it is true that agaves are well armed, that is no excuse to leave these outstanding ornamentals out of your garden.

Is there any excuse to leave agaves out of your garden?

Desert gardeners are awakening to the possibilities that agaves offer in a garden. Naturalistic plantings are very popular here in the Salt River Valley and agaves suit this planting well. The hard, sharp edges and the sword shape of the leaves also compliment billowy drifts of perennials or wildflowers, offering contrast and interest. There are agaves which are suitable for sun and shade here, and they come in a stunning variety of size and color.

A common use of agaves is as container plants, a style of planting which shows off the

agave's best features. Containers are easily movable and can create abundant, although miniature, gardens in themselves. Agaves in containers can fashion a commanding frame for an entry or walkway, and some of the more gently armed or compact plants make excellent accents around a pool.

Agaves generally tolerate container culture well. The agave's root system, like that of most succulents, is not deep, but is quite wide; therefore, the best pots for agaves are those wider than they are deep. Soil should be very well drained; in warm weather, water the pot when at least half the soil in the pot is dry, and in winter, water when it is dry nearly to the bottom. Container-grown agaves welcome monthly fertilization during the growing season.

A wide choice of dazzlers can go in pots

There are some excellent choices for container agaves. Although large, octopus agave (*Agave vilmoriniana*) with its soft leaves and interesting form can be especially effective. *A. desmettiana*, an urn-shaped plant with celadon green leaves, and *A. attenuata*, characterized by a large rosette of unarmed, wide, light green leaves arising from a whitish stem, are both beautifully complemented by a dark terra cotta pot. Both are excellent grown in the shade, but need some overhead protection



Agave zebra



Stages of agaves in bloom

from frost.

Containers are hospitable to more types of agaves than just those which have soft leaves or like shade. *A. angustifolia*, especially its white variegated form, is a long-standing favorite among potted agave fanciers. The striking *A. victoriae-reginae*, its near perfect symmetry emphasizing the dark green leaves lined with white, is a striking choice. Intensely symmetrical plants such as *A. parryi* var. *truncata*, *A. schidigera*, and *A. filifera* are also eye-catching in containers. If possible, place these plants where they can be viewed from above, to appreciate fully their symmetry and coloring.

They may be prickly, but don't have to be solitary

Agaves do not have to grow alone in a pot, but look effective mixed with blooming plants such as smaller lantana varieties, verbenas, or low wildflowers such as *nemophila* or Mexican primrose. Tiny agaves such as *A. toumeyana* var. *bella*, or *A. parviflora* are especially good in such mixed plantings.

It is in the ground, however, that agaves come into their own as garden plants. Agaves are well suited to our alkaline soils and require little or no soil amendments. A little compost or mulch, less than 25 percent of the backfill, is adequate when added to the planting hole.

Planting is quite easy. Prevent future problems by allowing the roots to dry out in shade for about a week before planting. Make the planting hole twice as wide as the plant, and no deeper than the container from which it came. Spread the roots gently, using your hands to untangle them carefully,

placing them slightly higher at the middle of the hole than at the sides. This helps reduce the risk of the crown sinking into the hole after the soil has settled and compacted.

Newly planted agaves need to be watered thoroughly. Water weekly for at least three weeks after transplanting. After that, the watering schedule depends upon the time of the year. In the cool weather of the fall and winter, water every three to four weeks. Established agaves often need no supplemental watering in winter. In summer, water agaves every two to three weeks. Plants which wilt or have shriveled or yellowing leaves are usually plants which are not being watered enough, regardless of the time of year.

Some magnificent choices for big spaces

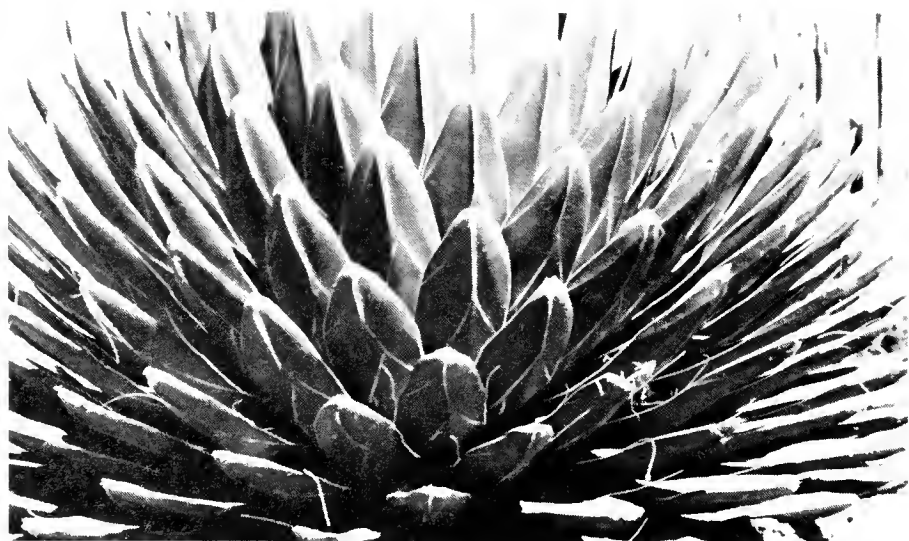
In a very naturalistic planting include *A. murpheyi*, *A. parryi*, *A. toumeyana*, or *A. deserti*. The cow horn agave (*A. bovicornuta*) grows quickly to about four feet tall and nearly as wide. It is a beautiful agave with dark, shiny, green leaves which round out as they grow, and pinch abruptly to the terminal spine. *A. gigantensis*, a well-armed agave with graceful curving leaves, and the stunning *A. zebra*, marked with dramatic white stripes and shaped like a thundercloud, are excellent choices where there is adequate room.

If you have more shade, try the lesser known *A. bracteosa*. This plant has fine, thin, curved leaves and makes a smooth clump. For the most part, agave plants die following bloom but *A. bracteosa* is a pleasant exception, blooming throughout its lifetime with tall spikes of white flowers.

In smaller yards, a more modest-sized agave may be better suited. Try the gorgeous *A. macroacantha*, a charming blue-grey agave with dark terminal spines and leaf margins. *A. geminiflora* and *A. stricta* have unusual leaves which are nearly round and are so numerous the plant resembles a sea urchin. *A. parryi* in all its varieties is beautiful. *A. toumeyana*, especially the subspecies *bella*, *A. colorata* with its remarkable form and intense leaf scars, and the uncommon *A. schidigera* are all excel-

(Continued on the next page)

(Desert Gardener continued)



Agave victoriae-reginae

lent choices for smaller spaces.

Agaves have few pests or problems beyond the ravages of the agave snout weevil. This small weevil relishes the bud of an agave as the nursery for its larvae. Female weevils taste their way around the garden, looking for plants with a particular taste or chemical signature; when they find it, they lay their eggs so the hatching larvae can feast on the bud. This problem is insidious; symptoms of an agave snout weevil infestation are nearly invisible until one day the surrounding leaves spread and fall, leaving the bud like a spike. Soon the bud too collapses and at this point there is nothing to be done to save the plant.

Victory is in the properly timed attack

The weevils' life cycle is the key to their treatment. Young plants are rarely infected by the weevil, which is more of a threat as the plant nears its blooming age. Larvae can be killed with a judiciously timed application of Diazinon, a powerful, toxic chemical that must be used carefully and exactly as described on the label. Look for small holes in the leaves near the base of a maturing plant, a sure sign of a female weevil's entry. Spread the chemical crystals liberally around the base of the plant, working them into the ground gently. Water them in thoroughly. Or, if using liquid Diazinon, pour the solution over the top of the plant to drench the base of the leaves. While

Diazinon has a fairly long life, it may not last the entire lifetime of an agave, so repeat applications may be necessary.

It is important to remove from your garden any agave that has been infested with the weevil and kill all the larvae you can find. There will be a lot of them, and in the process of pulling out the plant they will be quite visible. It is unwise to replant another agave of the same type in this spot which has already proven to be vulnerable to snout weevils.

I cannot personally adjust to the use of toxic chemical treatments, and therefore I take the tactic of using agaves which are less susceptible to the weevil. In general, the large-leafed giants are much more likely to succumb to the weevil, such as *A. americana*, *A. angustifolia*, and *A. chrysantha*. The likelihood of attack is much less in medium- to smaller-sized agaves and those with very hard leaves.

However you use them, agaves are a wonderful addition to any garden. Agaves are often available as small plants and these are splendid bargains. One of the great joys of gardening is to watch a plant develop and assume its place within the whole garden. The self-control to begin with smaller plants and allow them to mature is the hallmark of a wise gardener. Gardens are places of care, cultivation and beauty, where entwined lives circle and unfold gracefully. As with friends, the longer you and your plants are together, the better you fit together. ♦

(Mary Irish, our *Desert Gardener*, is director of public horticulture at the Garden.)



Agave colorata

Someone to Know

Lynn Trainum Has Watched This Garden Grow

Lynn Trainum, who just marked his thirtieth year at the Desert Botanical Garden this May, had answered an ad by Hubert Earle, then director of the Garden, seeking help with maintenance and the bookstore in 1964.

"Mr. Earle was looking for someone with experience in sales, and that was me," recalled Lynn, his soft Virginia accents unchanged by nearly a lifetime in the Southwest. "He called us 'junior horts.'"

Lynn worked with John Weber, the Garden's only horticulturist at the time. Mr. Earle also worked with them, as did student horticulturists who were hired especially for summer work.

"When I first came to work here, Mr. Earle said, 'Now, we'll do our outside jobs in the morning and then when it gets really hot in the afternoons, we'll find inside work to do.'"

"But he never gave me one of those inside jobs," Lynn said in good humor.

He has had an inside job for the past fifteen years, however, as the smiling, affable, beloved gent in the Gift Shop.

Many of his outside jobs remain as some of the distinctive features of the Garden's "hard-scape." He built the Pratt Ramada at the high spot of the Arizona Flora Trail; he helped line many of the Garden's paths with its weathered, black rock; he constructed the rock wall which greets visitors entering the Cactus House.

"One time we took all the plants out of the Cactus House, hauled out all that soil, dug down two feet through the caliche, brought in new soil, and replanted the cacti," he said. "Of course, it was during the summer."

Perhaps their most impressive work was in the 1970s when he and Weber salvaged 2,800 cacti from along four miles of the alignment of the new Shea Boulevard which was being cut through the desert "way up north." This salvage was a donation of an Arizona development company headed

by Fred Eldean.

"We brought back all kinds of cacti—saguaro, fishhook barrel, prickly pear, some chollas, you name it. We planted most of them on that hill behind Webster Auditorium and the rest out in front between the Gift Shop and Galvin Parkway."

"Lots of things have changed," Lynn said. "The golden barrel bed just outside the Shop was just about the most beautiful entrance you could make. In fact, it was beautiful all along that path." That path, formerly the entrance to the Garden, is now the final path visitors follow as they exit the Garden. "The changes make the Garden look bigger. And it looks better. Of course we didn't have the money back then," he said.

Lynn and his wife have a daughter who lives in Salt Lake City, Utah, and a son in Albuquerque, New Mexico, as well as three grandchildren and three great-grandchildren. He works in the Gift Shop Tuesdays through Fridays: "If Momma can stand me at home three days a week, they can stand me in here the rest of the time," he laughs.

Does he like cactus?

"Cactus? They're okay, I guess. Gardening is not my hobby. That would be like a busman's holiday—you know, where a bus driver gets a day off and spends it riding around on a bus!"—Carol Schatt ♦

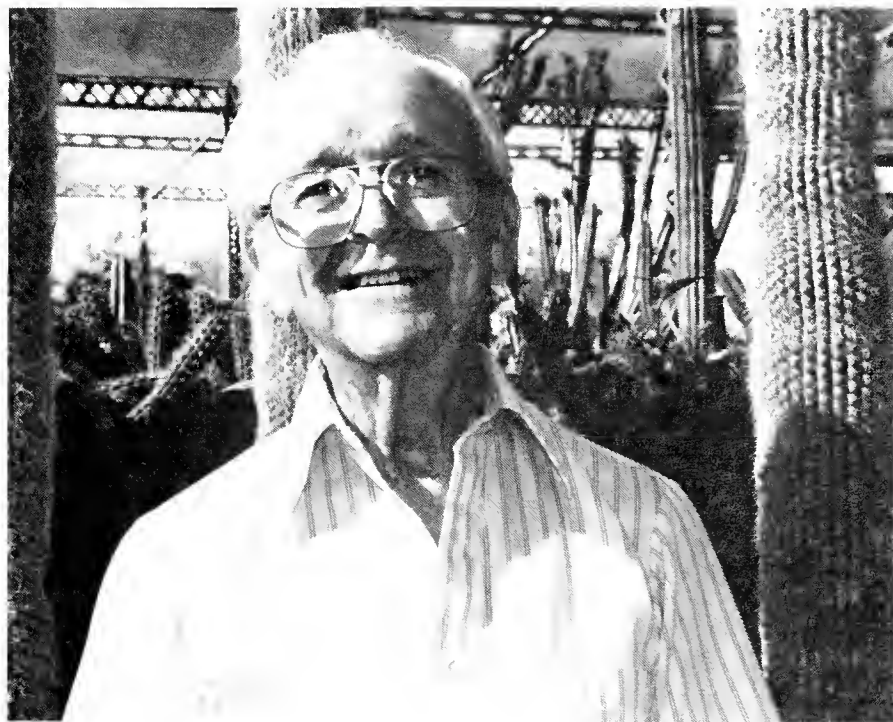


photo by Chuck Smith

Program Aims to Put New Plants in our Gardens

Bringing new plants into horticulture, whether they are of regional or exotic origin, is one of the oldest and most time-honored functions of botanical gardens. Wherever such a garden is located, it usually becomes a wellspring of new and interesting plant material.

Through much of the Desert Botanical Garden's history, introducing plants to home horticulture was of limited concern, although for a time in the early 1970s some staff members were interested in the use of desert plants as ornamentals, and worked to bring them to the attention both of nurserymen and the general public. Some of these plants were Texas ebony (*Pithecellobium flexicaule*), Baja fairyduster (*Calliandra californica*), and palo brea (*Cercidium praecox*).

In 1988, however, this Garden began an active role in ornamental horticulture. It started a retail sales program, selling plants daily during the busy season from the Sales Greenhouse. That first step was pragmatic and on a small scale, starting with one part-time staff member and ten volunteers



photo by Chuck Smith

KAET-TV (Channel 8) broadcast from the Spring Plant Sale with Bruce Miles as host. The March sale, according to Mary Irish, who headed the event, was "spectacularly successful," grossing \$70,000. Over 13,000 plants were sold, including several new introductions to home horticulture.

*The greatest service
which can be rendered any country
is to add a useful plant to its culture.*

—Thomas Jefferson

working in the Sales Greenhouse and one lath-house.

Naturally, plants obtained as excess from the Garden's own collection—by pruning, cleaning, rearranging, or trimming excessive growth—were potted and sold. This outlet for our extras continues to be an important source of interesting plants for the public, our staff and volunteers.

It quickly became obvious that the Garden's collection could offer a wealth of outstanding ornamentals if seed or cuttings were collected and offered for sale. So, in 1990, the Sales Department started the Plant Introduction Program.

Since that time, purposeful collections from around the region, as well as exchanges with other gardens and from interested nurserymen, have expanded dramatically. The program now employs a full-time propagator and has expanded to forty volunteers. A growing yard was created last year near the collection propagation center. A number of Arizona nurseries are now growing out material from the program in order to make our plants available to a much wider audience.

One of the most time-consuming and difficult aspects of a plant introduction program is to be reasonably sure, through long evaluation over many growing seasons, that a plant is a good subject for home landscapes in the area. Next year we will establish a test and evaluation site at the Garden. Few such sites exist in Arizona; the existence of this one should greatly increase the chances that new plants are also good plants.

Anyone who deals in ornamental plants should know that a benevolent ornamental in one area can become a pest in a new environment, unwanted and unwelcome. Examples of such pest plants in this area are the tamarisk (*Tamarix chinensis*), fountain grass (*Pennisetum setaceum*), and retama (*Parkinsonia aculeata*). Tamarisk has clogged and choked out native vegetation in streams throughout Arizona, but is a well-behaved ornamental in more northern areas. Fountain grass as well as retama spread easily and can establish populations of themselves in areas where they are unwanted, such



photo by Carol Schatt

Mary Irish, director of public horticulture, and Kirti Mathura, public horticulturist, look over plants in the shade structure with Howard Miller, a long-time volunteer in the propagation program.

as preserves of native plants or the neighbor's yard.

It is frankly impossible to guarantee that a new ornamental plant will not become a pest, but there are signs which can give the horticulturist or yard owner a clue. Plants are to be watched which aggressively produce seedlings not requiring optimal conditions or which establish at great distances from the mother plant. Plants with vegetative reproduction strategies that might make them difficult to control are another group requiring extra attention during evaluation.

In the program at the Garden neither *Caesalpinia palmeri* nor *Geoffreia decorticans* (El Chanar) are offered for sale or introduction because these plants raise grave concerns for their potential as pests. *C. palmeri* reseeds itself too easily, and *G. decorticans* forms water-grabbing thickets.

Fortunately there are a host of good plants from which to choose and the list is ever growing. From the Garden's collection, the program has already introduced to the public: *Acacia erioloba* (camelthorn), *Haematoxylon brasiletto*, *Malephora crocea*, *Lampranthus multiradiatus*, *Ruschia carolii*, two species of *Cephalophyllum*, *Diosporos lycioides* (African persimmon), *Cissus trifoliata*, *Opuntia bravoana*, *Opuntia tomentosa*, and *Agave macroacantha*. Other recent introductions include *Aloysia gratissima* (sweet aloysia), *Pavonia lasiopetala*, and *Yucca campestris*.

Next fall the first group of *Dudleya saxosa*, a beautiful native succulent, will be for sale. With luck the seedlings of *Cassia armata* and *Cassia purpusii* will survive the ravages of rodents this summer and be ready for fall planting as well.

The work of the Plant Introduction Program continues to grow, and is becoming a vital component of the Garden's mission in the horticulture of desert plants. — Mary F. Irish ◇

New Signs on the Trail: What Flies? Who Salutes?

Since late winter and for many more months, we'll be seeing what appear to be makeshift signs throughout the Garden.

That's because those signs—black lettering on light-weight paper stock, mounted on sandwich boards or even clipboards—are telling us just what our Garden visitors want to know.

A part of the \$634,000 National Science Foundation grant awarded the Garden last year provides for new interpretive signs, investigation stations and plant labels along Garden paths. And to develop those new, informative signs, the Garden Education Department is doing what industry and politicians have been doing for years: testing the product.

Working with Dr. Stephen Bitgood and Dr. Arlene Benefield from the Center for Social Design in Jacksonville, Alabama, who are leaders in the field of visitor study and evaluation, Garden staff Kathleen Socolofsky and Ruth Greenhouse had ideas of what Garden visitors want to learn.

"We then created signs and are seeing how they really work," said Kathleen. Teams of observers watch and time visitors as they scan, read, or ignore the temporary signs. If visitors spend twenty seconds or, even better, call others' attention to a sign and plant display, the sign may be good one, Kathleen said. Follow-up interviews with selected visitors help sharpen and refine the text of the signs. For instance, the header "The Century Plant: Does It Really Live 100 Years?" got far more interest than its predecessor, "Agave: Water Saving Leaves."

Dr. Wilhelmina Savenye of Arizona State University and doctoral candidate Larry Roberts from the University of Alaska are helping evaluate visitor response to the planned additions.

Public reaction reveals whether the temporary signs are attracting attention and if they're located in the right spots. When the permanent signs are produced this fall, they should be extremely effective and helpful for Garden visitors. And the process of learning what the public wants has been "an amazing experience," Kathleen said. ◇



Plant Profile

Echinopsis: Easy and Exquisite

Echinopsis sp. may be the geraniums or petunias of the cactus world. And that's a compliment, because they are easy to grow and far more rewarding than we deserve.

We generally think of them as clusters of green cactus balls, embarrassingly easy to start from the offsets which mound up through the years. Their flowers, among the most splendid in the Cactus Family, are exquisite—large, often fragrant, usually opening at night and lingering on through the next morning.

The large and varied display of *Echinopsis* sp. between the bridges along the Garden's Desert Discovery Trail is a traffic-stopper through the summer when the plants bloom intermittently starting in April.

Native to South America, the genus may comprise forty species or more, depending on which system of classification you accept; the lines of classification between *Echinopsis*, *Lobivia*, and even *Rebutia* sp. are sometimes blurry.

The genus name derives from the Greek *echino*, meaning "hedgehog" or "sea urchin," and *opsis*, meaning "resembling." The genus was established in 1837, making it one of the older names in the Cactus Family.

Generally speaking, the plants are green and

globular with eight to thirty ribs, uniform spines and no woolly crown. Old specimens may become slightly elongated. They form mounds ranging from four inches tall to two feet.

Their white or pink flowers are trumpet-shaped, long, hairy and scaly, characterized by a distinct ring of throat stamens separate from other stamens. They open in the evening, can be strongly scented and may stay open as long as three days. In recent decades day-flowering species have been introduced with red or yellow blossoms; these are derived from upland species where nocturnal pollinating insects are absent.

Echinopsis species are not self-fertile and need cross-pollination with seedlings from different stock before fruit can develop to produce the narrow, oblong, dull-black seeds.

Many species of *Echinopsis* exist, the most popular being *E. eyriesii*, *E. oxygona*, *E. tubiflora*, and the Easter lily cactus, *E. multiplex*.

They grow well in pots indoors, appreciating winter temperatures ranging from 40 degrees F. at night to 65 in the day, and during spring and summer from 65 at night to a daytime high of 85.

Let the soil in the pots become dry between thorough waterings in spring through autumn, and even drier in the winter. Too much winter heat and watering will decrease summer blooms and increase offsets. They are fast growing in a mix of equal parts sand and commercial potting soil to which one tablespoon each of ground limestone and bone meal have been added per gallon of mix.

Outdoors, *E. multiplex* is hardy to -20 to -10 degrees F., and the other species to 10 to 20 degrees F. You can plant them in light, sandy loam with good drainage, and in a spot where they will get partial shade during the heat of the day as they don't like extremely dry air. The east side of a wall or house, or under a mesquite or palo verde suits *Echinopsis* very well. Feed them in spring with a high phosphorus fertilizer.

And then get into the delightful habit of visiting your garden after dark. You'll love the moonlight, summer's coolest temperatures, and your outstanding *Echinopsis* blooms! — Carol Schatt ♦



photo by Tom Norris



In Print

Lots of Answers, And a Few More Questions

By Jane B. Cole

Remarkable Agaves and Cacti

By Park S. Nobel

166 pp. New York: Oxford University Press, 1994.
\$34.95 cloth, \$19.95 paper.

Many of the questions that come to us at the Desert Botanical Garden are answered in this book. With his background as a biology professor at the University of California, Los Angeles, Park Nobel knows how to make scientific information understandable for ordinary readers. He also has a purpose: He wants to stimulate interest in developing some of these plants as modern-day crops.

The book is divided into sections which describe traditional understanding of these plants, agave uses, cactus uses, the importance of root systems (underground) and shoot systems (above-ground), water use and carbon dioxide uptake, how the plants produce, and, finally, predictions for the future.

Each section reads like a lecture. When describing how the agave shoot grows, Dr. Nobel says, "The shape of the agave shoot is ideal for distributing light relatively uniformly over all its leaves. . . . (A) new leaf of an agave unfolds from the central cone of folded leaves at 137 degrees clockwise or counterclockwise from the previously unfolded leaf. This unfolding pattern leads to a rosette of leaves pointing in different directions at regular intervals. The most recently unfolded leaves are nearly vertical, and the oldest leaves are nearly horizontal. For most of the day, sunlight consequently can be absorbed by the younger leaves and also can reach the older (lower) leaves."

There is no simpler way to say that.

And Dr. Nobel is interested in the conservation of these plants. "The aesthetic appreciation of agaves and cacti is important for their preservation, but the future of many species resides in their eco-

nomic usefulness." He has great hopes for this economic salvation because of the high productivity of these succulent plants in relation to the amount of energy used for their growth and harvest.

Reading this book from cover to cover supplies a good background to understand agaves and cacti. The author's lists of references at the end of each chapter also guide readers into further study. References include Gentry (on agaves), McAuliffe (on saguaros), Pinkava (on agaves), Gibson (on cacti), and Valiente-Banuet (on nurse plants).

Any student of desert plants would find this a helpful addition to a book collection. It will answer some questions and suggest new ones for further study. ♦

(Jane Cole is the Garden librarian. Richter Library is available on weekdays to Garden visitors and for phone reference at (602) 941-1225.)

New Membership Categories Announced

Two new categories of membership in the Desert Botanical Garden are announced: the Director's Circle and the President's Club.

The Director's Circle recognizes individuals giving \$5,000 or more. Benefits at this level include those of Saguaro Society membership (unlimited free admission for you and your guests, special events and invitations as well as discounts for classes and at the Gift Shop) plus two tickets to Dinner on the Desert.

The President's Club is for donors of \$10,000 or more. They are entitled to the benefits of Saguaro Society membership, plus four tickets to Dinner on the Desert and a signed botanical print by Wendy Hodgson.

"These categories were created because we have people giving at these levels but were not being recognized," said Robert Breunig, executive director. "Giving at these levels shows incredible commitment. We are very grateful."

If you would like to become a member at either level, contact Carolyn O'Malley or Sherry New at 941-1225. ♦

Botanical Illustrations Available to Researchers

Research botanists wishing to know how a certain plant looked two hundred years ago can study that plant through a collection of botanical illustrations at the Desert Botanical Garden.

The individual prints are pages from botanical books dating from the 1600s to the present. They are drawings, pen-and-ink sketches, black-and-white woodblocks, engravings and lithographs. They are all considered to be originals and many are hand-colored.

They are also extremely sensitive to light (which can fade their colors) and susceptible to oils from human hands; they are housed in cases under special light- and temperature-controlled conditions.

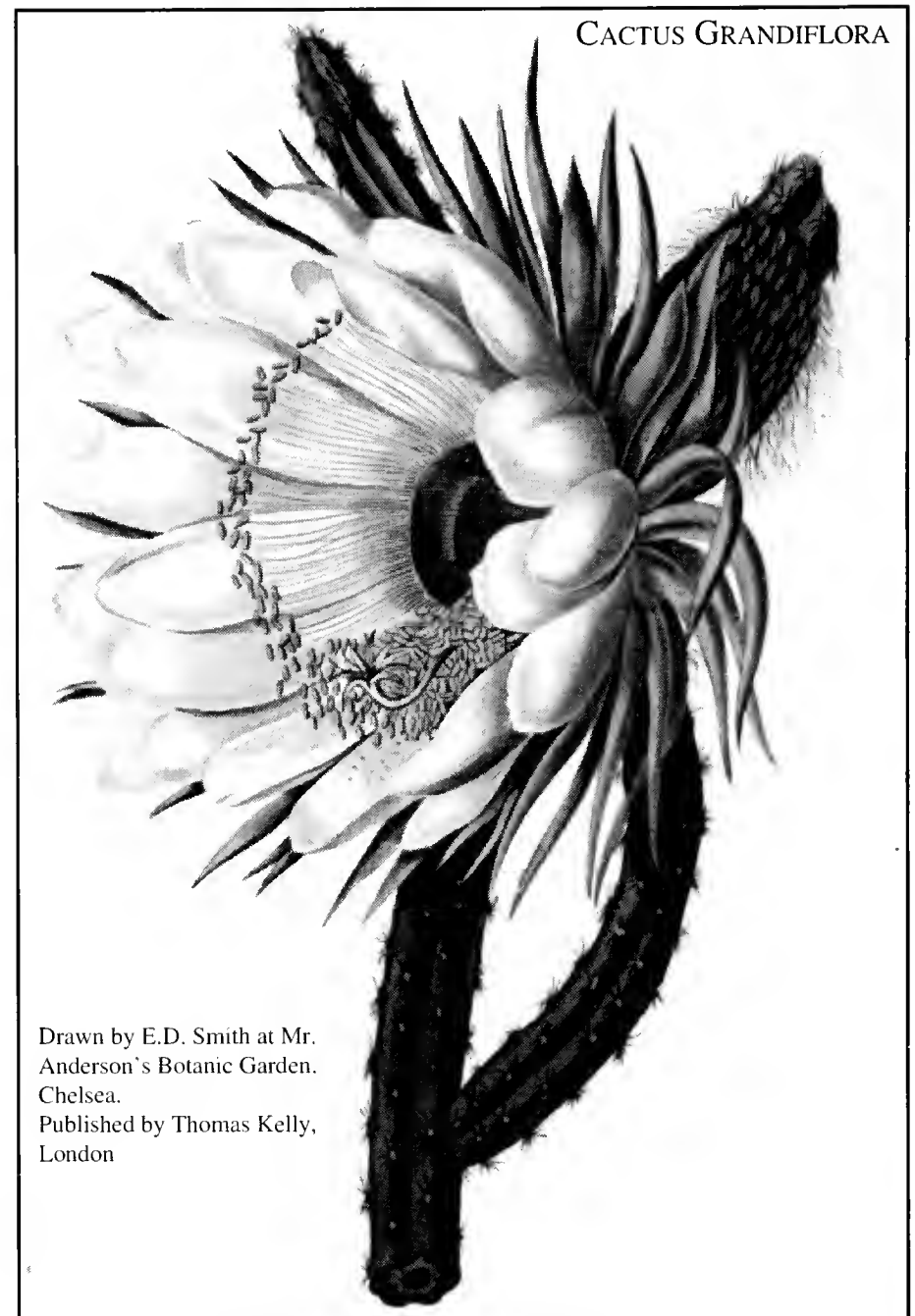
The collection is available only to researchers studying specific plants depicted in the illustrations. "We view it as a scientific collection, although others may view it as beautiful," said Jane Cole, Garden librarian.

"The way people in the old days used to document their botanic garden collections was not through electronic or photographic media," she said. "They made drawings and labeled the plants. Someone would write a book describing the plants in a specific collection. Accompanying it would be a book of illustrations.

"Botanical illustration continues as an art," Jane said. "And Dr. Ted Anderson is documenting our cactus collection with the help of volunteers taking photographs."

The Garden's collection is an old one. It came to the Garden in the 1960s as a part of the Max Richter collection of books and papers. The six hundred Richter illustrations joined the twenty which had been given to the Garden by W. Taylor Marshall, the Garden's third director in the 1940s.

"The prints were being stored in boxes in a garage, and it was then that Rodney Engard, at that time a staff botanist, and Lillian Diven, who was the publications editor, decided something needed to



Drawn by E.D. Smith at Mr. Anderson's Botanic Garden, Chelsea.
Published by Thomas Kelly, London

be done." Jane said. "She, with some other volunteers, put them in acid-free folders, mounted them on mat board, and made sure they were properly stored. Lillian also staged two botanical illustration exhibits."

"They were being kept in detergent boxes and none of them were identified. It was like discovering King Tut's tomb," said Lillian, recalling the work she and Director Engard did to rescue and restore the collection.

Four volunteers are now working with the collection, Julie Gibson, Jane Kealy, Anne Gully, and Bill Cartmell. They are looking at the collection and researching what additional care is needed.—Carol Schatt ♦

How You Can Help Your Garden Through Outright Bequests

By Linda S. Batts

Members and friends of the Garden find many ways to express their support for the Garden. Many supporters would like to make additional contributions to the Garden during their lifetimes, but find it difficult to do so for various reasons. Nevertheless, these supporters are discovering that they can help the Garden maintain its standard of excellence by making a significant contribution to the Garden at death.

Perhaps the most popular means of contributing to the Garden at death is the outright bequest. An outright bequest can be included in a will or a trust agreement and can be expressed in a number of ways: as a specific gift of cash or property; as a percentage of the estate; or as the residue of the estate. Three examples of outright bequests follow.

Specific Gift of Cash

Mr. and Mrs. Flora are long-time members of the Garden and want to recognize the Garden for the many years of enjoyment they have derived from their membership. They are updating their estate plan and creating a trust to increase the protection of their estate. Mr. and Mrs. Flora provide in their trust agreement that upon the death of the survivor of them, a distribution of \$20,000 will be made to the Garden, and the residue of the trust will pass to their children. If Mr. and Mrs. Flora die leaving a trust valued at \$450,000, the Garden would receive \$20,000, and Mr. and Mrs. Flora's children would each receive \$215,000.

Percentage of Estate

Ms. Plantlove is a single woman with no children. She wants to contribute to the Garden, but is concerned about maintaining sufficient assets to support herself during her lifetime. Ms. Plantlove signs a will leaving twenty percent of her estate to the Garden and eighty percent to certain family members. If Ms. Plantlove's estate is worth \$200,000 when she dies, the Garden would receive \$40,000, and Ms. Plantlove's relatives would receive \$160,000.

Residue of Estate

Mrs. Loveplants is a widow and has no children. Mrs. Loveplants is a long-time member of the

Garden and would like to make a gift to the Garden in memory of her husband, who was also a member prior to his death. To accomplish this purpose, Mrs. Loveplants signs a will leaving the residue of her estate to the Garden after the payment of certain specific bequests totaling \$150,000. If Mrs. Loveplants died leaving an estate valued at \$350,000, the Garden would receive \$200,000 that would be recognized by the Garden as made in memory of Mr. Loveplants.

As you can see, naming the Garden to receive a portion of your estate is an excellent method of contributing to the Garden. With careful planning, you can help the Garden continue its unique mission by providing a living legacy for future generations. For confidential bequest information, contact Sherry New, Director of Development, at 941-1225. ♦

(Linda S. Batts is an attorney in the law offices of Ryley, Carlock & Applewhite and a member of the Garden's Planned Giving Committee.)

Changes in Membership Policy

The membership department announces changes in membership policy, immediately effective. Memberships now expire on the date printed on your membership card. Previously they were honored through the month printed, regardless of date. Members will also notice expiration dates on their guest passes that expire the same day as the membership period.

The number of guest passes is also being changed. An individual will receive four; family, four; Contributing Member, eight; Agave Century Club member, ten, and Ocotillo Club member, twelve. Members of the Saguaro Society, Director's Circle, and President's Club will continue to receive unlimited guest privileges.

The membership department continually compares Garden benefits and values to those of other community institutions, and is pleased to report the Garden is the best deal in town! Call 941-1225 with your ideas and suggestions. ♦

In Appreciation

The Desert Botanical Garden wishes to acknowledge the support of all of its 7,185 members. Recognized in the Quarterly are members of the President's Club, Director's Circle, Saguaro Society, Ocotillo Club, Agave Century Club, Desert Council and donations received from January 1, 1994 through March 31, 1994.

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Rupert B. Watson
Richard & Elaine Wilson
Paul & Margaret Wisniewski
Harry & Mary Young

DESERT COUNCIL

A corporate membership category, Desert Council represents an alliance between the Desert Botanical Garden and the business community for donors of \$250 or more.

Manzanita (\$250 - \$499)

Arizona Sun Products, Inc.
Atkinson & Associates, Inc.
Coopers & Lybrand
Mexican Tile Company
THE BROADWAY

Desert Willow (\$400 - \$999)

Ryley, Carlock & Applewhite
UDC Homes, Inc.

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Air Comm
H 2 O Plus

Mesquite (\$5,000 - \$9,999)

American Express

Palo Verde (\$10,000+)

Salt River Project

SONORAN CIRCLE

The Desert Botanical Garden is honored to acknowledge the following individuals who have included the Garden in their estate plans.

Anonymous (5)
Dean & Bernadette DeAngelis
Dan & Elaine Gruber
Delbert J. Harr
Frank Hennessey
Mike & DeAnne Holt
William Huizingh
Melissa Kemp
Samuel & Betty Kitchell
Virginia Korte
Harry & Rosellen Papp

HONORARY DONATIONS

Gifts in honor of:

Robert G. Breunig
Chapter BA. P.E.O.

William Huizingh's 75th Birthday
Robert & Karen Breunig
DBG Staff

MEMORIALS

Memorial contributions are used to provide for the ongoing horticultural, education and research programs of the Desert Botanical Garden. Contributions have been received in memory of:

Richard Adler
Nancy & Ken Granat

Mr. & Mrs. R. G. Benton
Margaret Ellis

Patricia Boyle
Thomas K. Avery
Diane Barker
Charles & Bernice Brewer
Jane B. Cole
Wendy Hodgson

Kayla Kolar
Sherry New
Carolyn O'Malley
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Paul Diaz

Central Arizona Cactus & Succulent Society

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Larry Fisher

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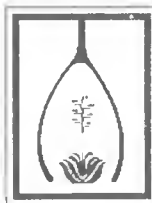
Jack Whiting

Susan Shipka
Patsy Staniszeski

MEMORIAL TREES

Gifts through the Memorial Tree program provide for horticultural maintenance of the trees on Ullman Terrace. Contributions have been received in memory of:

Patricia Boyle
Thomas K. Avery
Diane Barker
Charles & Bernice Brewer
Jane B. Cole
Helen S. Dowling
Wendy Hodgson
Kayla Kolar
Sherry New
Carolyn O'Malley
Jolene Pierson



WISH LIST

If you have an item you believe would be useful, please call the Garden at 941-1225 for more information.

Desktop copy machine

Microwave oven

Agaves of Continental North America,
by H.S. Gentry

Environmental Biology of Agaves and Cacti, by P. Nobel

Picks

Tool boxes

Tupperware containers

Small soil mixer

Measuring tape

Measuring spoons, beakers, cups

Gas-powered generator

Pliers

Screwdrivers

Socket set

35mm camera

Storage shed

Heavy-duty blender

Laptop computer

Stereoscopic dissecting microscope

Portable/small refrigerator

Office chairs

Flash unit for Nikon 4004 35mm camera

Coffee pot

50-foot and 75-foot garden hoses

Shade structure

Plastic five-gallon paint buckets

Mist bench

Fill dirt top soil, large quantity

Electric iron

Thanks to these members for their generous response to the last "Wish List"!

Anonymous - shallow baskets for gift shop

Ed Boks - refrigerator

Ann & Dick Brown - back issues of Garden publications

Leona Dungan - back issues of Garden publications

Robert & Gay George - TV trays

Deborah Ham - refrigerator

Fred & Lisa Meyer - two refrigerators

Ben & Alice Seaborne - refrigerator

Susan Shipka
Pat Smith
Patsy Staniszeski

Sheila Payne
Intel Corp MSPD Employees

Bill Spanko
Mrs. Jean Spanko's Students

Jack Whiting
Susan Shipka
Patsy Staniszeski

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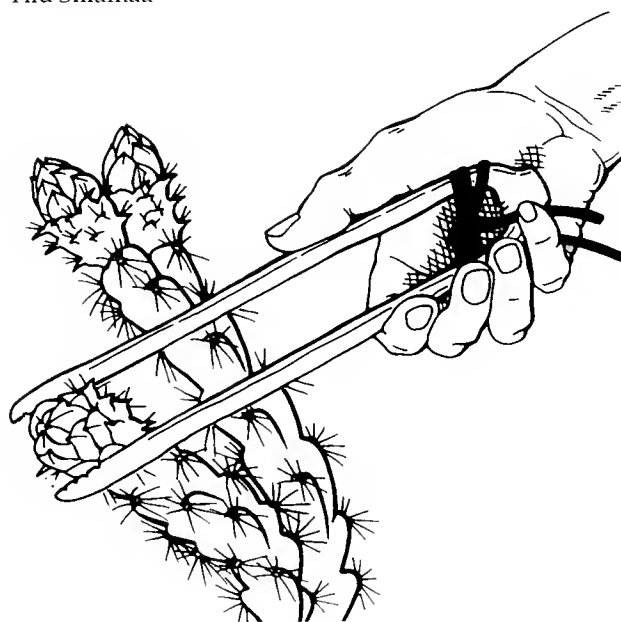
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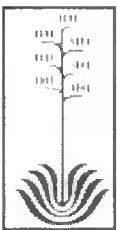
Members of the Gila River Indian Community work to rebuild the Pima Roundhouse, located on the Plants and Peoples of the Sonoran Desert Trail. The members were Adrian Hendricks, Richard Allison, and Brett Kisto.



photo by Chuck Smith

Summer Evenings In The Garden

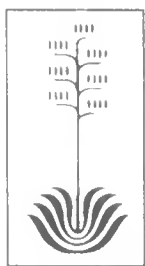
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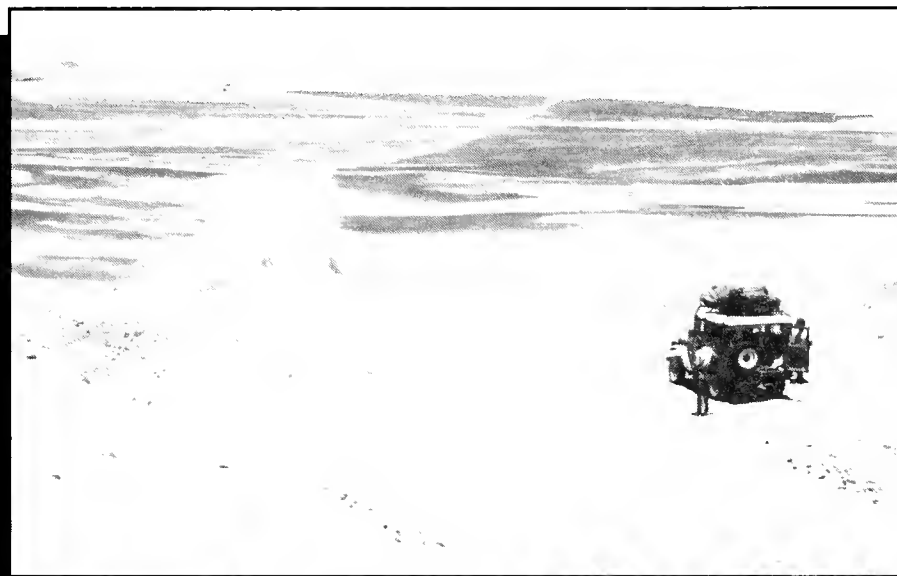
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SONORAN QUARTERLY

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September - November 1994/Volume 48, No. 3



**Reporting: The Willard
Research Expedition To Peru**
pages 4-7



Two International Research Projects Are Extending the Garden's Role In Global Plant Conservation

On Sunday, May 8th, in a French restaurant in the Spanish colonial era town of San Miguel de Allende in the Guanajuato province of Mexico, the Desert Botanical Garden, CANTE (the first private nonprofit botanical garden in Mexico), and CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora, an international agency established to end the illegal trade of endangered plants and animals) signed a three-year agreement to form an international partnership to research and monitor the status of rare cactus populations in Mexico.

The long-term goal of the project is to help Mexico develop information and strategies for ending the plunder of Mexican rare cacti by irresponsible collectors in the United States, Europe, and Japan. For CITES, which has been instrumental in slowing the illegal trade of many exotic animal species, this is a very significant project. This is the first major research project aimed at ending the illegal trade of plants.

The partnership between the Desert Botanical Garden and CANTE is also important. As Mexico's first private garden and one that is developing a major collection of Mexican cacti, CANTE has natural affinities with the Desert Botanical Garden. We are honored to have the opportunity to share our experience and knowledge with them.

This project represents the second DBG research project this year to take place outside the



photo by Elliott Lincis

borders of the United States. Earlier in the spring Garden botanists affiliated with the Ed R. Willard Research Expedition studied and collected cacti in Peru. These projects are of importance; the Desert Botanical Garden is extending its global reach and involving itself in research and conservation efforts in other deserts of the world. This involvement is in keeping with the goals of the founding trustees of the Garden who envisioned the Desert Botanical Garden as an institution actively involved in deserts on a global basis.

As conservation concerns affect more countries, it is appropriate that the Garden should take an active and expanded role in helping to preserve desert plants not only in our own Sonoran Desert, but in other areas of the world.

The development of an international program is the culmination of one of a number of dreams that the staff of the Desert Botanical Garden has shared over the last decade. What gives the Desert Botanical Garden its strength is that it is a place where people can dream, can reach, and can extend themselves and their contributions.

If there is one message that I, as the outgoing director of the Garden, would like to share with our members, it is that the Garden is an institution of enormous substance, and one which deserves and needs strong, on-going community support. ♦

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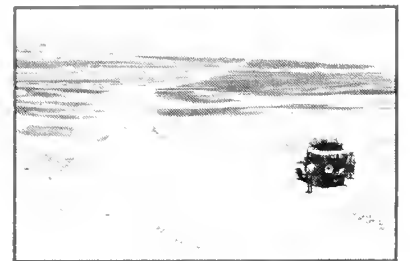
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ABOUT THE COVER:

This extensive region of dunes and desert pavement devoid of vegetation lies between the city of Ica and the Peruvian coast. Desert



Botanical Garden scientists explored the fascinating and arid region on a collecting trip late last winter. The specimens, living and preserved, which they collected will increase understanding of many South American species of cacti. *Photo and map by Joseph R. McAuliffe.*

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The Willard Research Expedition To Peru

4

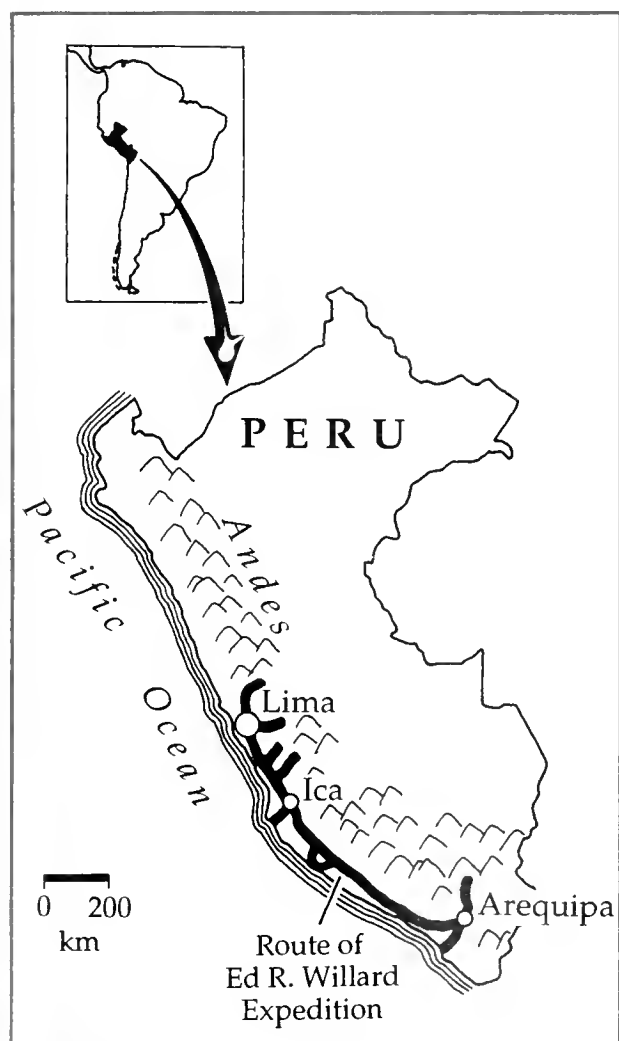
By Joseph R. McAuliffe, Ph.D.
Director of Research

On a field trip two years ago I shared lunch with visiting botanists under a giant ironwood in the midst of a lush, fragrant, rain-nourished Sonoran Desert springtime.

"This is certainly NOT a desert!" exclaimed one of the scientists and I understood his point and remembered it well last winter when I accompanied Dr. Ted Anderson, our Garden senior research botanist, and Wendy Hodgson, curator of the Garden herbarium, on a three-week expedition to the coastal desert of southern Peru, one of the driest places on earth.

Climatologists designate Peru's coastal desert as *hyperarid*, receiving less than an average of one inch (25 mm) of precipitation per year. No place as arid as this exists in the Sonoran Desert.

Despite the hyperaridity of the Peruvian coastal desert, the region contains a variety of fascinating plants, including many cactus species. The



Scientists Look at Plants

main purpose of our research trip to Peru was to obtain a scientifically documented collection of living cacti, since much remains to be learned about the relationships of cacti from this part of South America. Much of the original taxonomic work conducted at the turn of the century contains substantial errors and requires considerable reworking and revision. A collection of Peruvian cacti maintained at the Desert Botanical Garden offers cactus specialists ready access to the live plants and herbarium specimens that are necessary for scientific study.

This collection trip originated through the work of Fred Katterman, of New Jersey, whose avocation for many years has been the taxonomic study of cacti from South America, most recently small columnar cacti in the genus *Eriosyce*. Fred had just finished writing an impressive taxonomic revision of this genus in a monograph published by the Royal Botanic Gardens of England (reviewed on page 12). The book deals primarily with species from Argentina and Chile, and Fred needed material from neighboring Peru in order to answer additional basic questions about the geographic distribution and evolution of this cactus genus.

Fred suggested that plants collected in Peru be housed at the Desert Botanical Garden, and invited Dr. Anderson to join his wife, Kathleen, and him on a collecting trip to Peru. Wendy and I went along to collect herbarium material and basic ecological data from various environments.

Two financial gifts, one from Mrs. Virginia Ullman and a second from an anonymous donor, paid for the travel and research expenses of the three-week project. The Peru expedition and resulting collections are named in memory of Ed R. Willard, as requested by the anonymous donor.

We departed on February 14 and returned to Phoenix on March 7. We owe much of the success of our trip to the help and guidance of our Peruvian hosts. Dr. Carlos Ostolaza, a retired surgeon, orchestrated many of the necessary arrangements.

in a Desert that Receives No Rain

Dr. Ostolaza is a cactus enthusiast and a past president of the Peruvian Cactus and Succulent Society. Camillo Diaz Santibáñez, a field botanist with the Natural History Museum of the University of San Marcos in Lima, drove us more than 2,000 km (1,240 miles) in his old but trustworthy Toyota Landcruiser. His considerable field savvy and attention to detail ensured our safety throughout the trip, and he deservedly earned the nickname

"The plants that have adapted to this desert region are absolutely fascinating."

"Santo"—"the saint." Guido Lombardi, a young medical student about to finish his medical degree, also joined us for the trip. Accompanied by two physicians and one of Peru's most competent field botanists, our health and safety were unquestionably in excellent hands.

After two days of preparation in Lima, the eight of us departed to the south on the Pan-American Highway in two four-wheel-drive vehicles. For the next two weeks we worked and explored the coast and small valleys, and at one point traveled inland to the foothills of the Andes and made collections at an elevation of about 13,000 feet.

The extreme aridity of coastal Peru is due to the influence of cold Antarctic waters (the Humboldt Current) which flow northward along the west coast of South America. The air above the Humboldt Current is also cooled considerably. The cool air holds relatively little water vapor, and convective uplift of storm cells does not occur. The result is a coastal desert that receives virtually no rain.

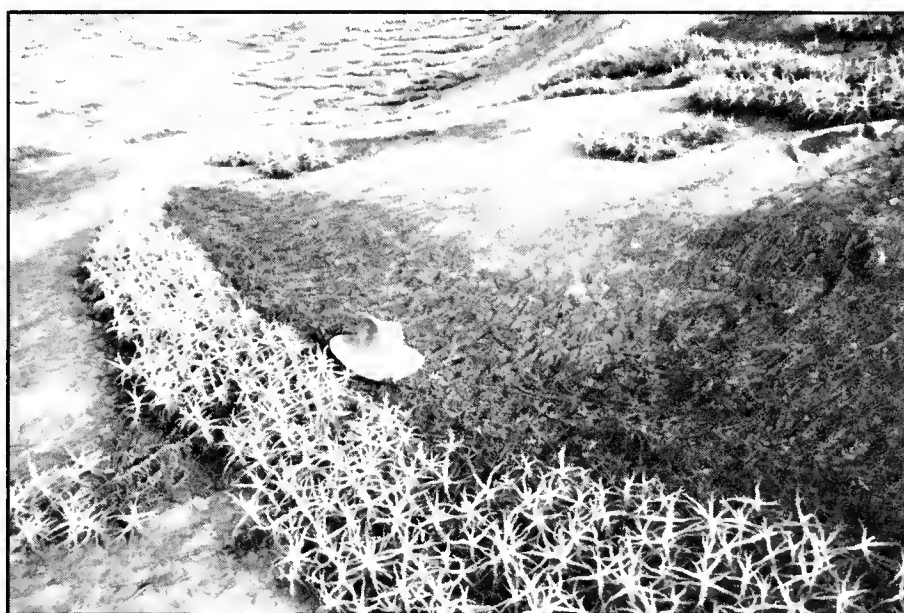
In the winter season, however, dense fogs called "garua" move inland. Water from these heavy fogs condenses and collects on surfaces of

plants, rocks, and the soil and thereby provides most of the water the plants use.

We were in Peru during the austral (literally, *coming from the south*) summer when dense fogs do not develop. Wherever we worked, however, we saw evidence of the importance of the seasonal fogs as a moisture source for plants. Since fog moves inland from the sea, the windward sides of hills facing the sea often were the only ones with plants while adjacent, leeward slopes were typically completely barren. In some places, cacti were found only below the vertical faces of large rocks and boulders. Water condenses on these protruding surfaces and drips to the base of the rocks, creating locally moist microhabitats.

The geography of the coast greatly affects the movement and condensation of fog and, consequently, the amount of vegetation. Where hills and mountains arise abruptly from the coast, considerable condensation of fog on the steeply inclined land leads to an abundance of plants. However, where the incline of the coast is extremely gradual (for example, near the city of Ica), the fog passes over the relatively level land without con-

(Please turn to the next page.)



Band-like growths of ground-dwelling *Tillandsia* have no root system and merely rest on the soil surface.

densing. These areas are usually extremely barren and in one such case west of the city of Ica, we drove for tens of miles through sand dunes and desert pavements that completely lacked any plants.

The plants that have adapted to the harsh conditions of this desert region are absolutely fascinating. The root systems of many cacti were typically extremely shallow. One small cactus the size of a large pincushion cactus, had radial roots spreading to 50 cm in every direction but these roots were no deeper than 2-3 cm below the soil surface. Such shallow root systems are probably necessary to exploit the shallow infiltration of moisture derived from fog.

A striking adaptation to fog as a moisture supply is exhibited by ground-dwelling bromeliads in the genus *Tillandsia*. These plants have no root system and merely rest on the surface of the ground. Instead of taking up water from the soil with roots, these strange plants obtain water by absorbing it directly through specialized structures on their leaves.

One of the most exciting discoveries of the trip was at a breathtaking site overlooking the Pacific coast occupied by the large columnar cactus, *Neoraimondia arequipensis*. Amid the cacti were ancient foundations of small houses, perhaps dating to Inca or pre-Inca times. There was no source



The smallest cactus, *Pygmaeocereus familiaris*, has a short, fleshy taproot.

of water near the ruins and the extremely rocky terrain would have made agriculture unlikely. We think that the ruins may represent an ancient, seasonal camp for the collection of cactus fruit. *N. arequipensis* have large, dark green fruits about twice the size of kiwi fruits and with a similar flavor. Just as the fruit of the saguaro was important to the ancient Hohokam and the historic Pima and O'odham peoples of the Sonoran Desert, a dependable, seasonal supply of cactus fruits in the harsh Peruvian desert may have been vital to its early

The scientists collected specimens and environmental information on forty species of little-known South American cacti.

human inhabitants. This site south of the town of Chala offers rich future research possibilities that link investigations in archaeology, ethnobotany, and plant ecology.

We collected over forty species of cacti from twenty-eight sites. They include the Americas' smallest cactus, *Pygmaeocereus familiaris*, as well as large, many-branched columnar cacti that reach heights of many meters.

Before deciding to collect from any area, we evaluated the status of existing populations of cacti. We did not collect from extremely small populations because of the potential harm such collection might inflict.

In areas where we decided to collect, we accomplished a variety of different tasks. Wendy used an instrument called a Global Positioning System to determine the exact geographic coordinates (latitude and longitude) and elevation of each site. The GPS communicates with several specialized orbiting satellites and provides a precise fix on location. Whenever possible, we made two separate collections of each cactus species: one of living plants and the other of plants to be used for dried herbarium specimens.

Many of the cactus species we encountered were flowering or bore fruit. Collections of flowers



Stand of *Neoraimondia arequipensis* south of Chala.

and fruit are extremely valuable parts of herbarium specimens and are necessary materials for anatomical and systematic studies. Additionally, viable seeds collected from many species have been successfully germinated since our expedition by horticulturist Patrick Quirk at the Desert Botanical Garden, providing many more living specimens.

Hundreds of photographs were taken to document plants in the field and the environments in which they grew. Wendy assigned a field collection series number to each plant and kept track of all the plant collection records.

In addition to cacti, we collected other plants and prepared them as herbarium specimens. I recorded a variety of environmental data on geological features of the terrain, soils and, in some cases, seasonal use of the land by goats and cattle.

At the end of almost every day, often in the plaza of a small hotel, we worked into the evening, processing the day's collections and wealth of information. Fred, Ted, Carlos, and Guido thoroughly removed soil from the roots of each living cactus specimen as required for agricultural inspection in the United States. Wendy carefully processed the many herbarium specimens which needed frequent changes of paper to insure proper drying. I prepared soil samples and measured their salinity with an electrical conductivity meter.

One of the biggest jobs of the expedition, though, awaited our return to Lima. It took several days for Ted, Wendy, and me to prepare the many cacti collected for herbarium specimens. Individual cacti had to be sectioned and halved, removing most of the internal succulent tissues before drying.

Half of our specimens, both living and

herbarium, were given to the University of San Marcos Natural History Museum. This museum houses the largest herbarium in Peru; our collections were greatly appreciated because up to that point the herbarium lacked specimens of Peruvian cacti. In this way, our work contributed not only to the Desert Botanical Garden's scientific collection, but also to the progress of botanical research in Peru. Our work and cooperation with institutions such as the University of San Marcos Natural History Museum are an important outreach to botanists in other parts of the globe. ♦

(Editor's note: The Ed R. Willard Expedition to the Peruvian coastal desert represents the kind of international focus that the Garden continues to pursue as one of the world's foremost botanical gardens with a focus on desert plants. The scientific collections and information obtained on this expedition will contribute greatly to the understanding of one of the world's driest deserts and its plant life.)



Wendy Hodgson and the ruin of an ancient structure in the *N. arequipensis* stand near Chala.

Photos by Joseph R. McAuliffe

International Research: DBG and Mexican Garden Launch Joint Project

The Desert Botanical Garden has joined CANTE, a Mexican botanical garden, arboretum and research institution, in a three-year study of populations of rare or endangered cacti in Mexico.

Funding for the study, which began in June, is provided by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and is for \$68,600 over the study period.

The study will look at twenty to thirty populations of cacti in about a dozen locations in Mexico and Baja California, said Dr. Ted Anderson, senior research botanist at the Desert Botanical Garden. He represents the Garden in the project.

The impact of illegal collecting on these populations is a major focus of the study. Mexican cactus flora is frequently subjected to illegal plundering. Researchers will evaluate the sizes of the cactus flora populations, estimate the amount of legal and illegal collecting which has taken place, and recommend on the basis of better evidence whether the various species should be classed as endangered, rare, or not endangered.

"Are these populations as rare as we thought in 1986 when CITES established its lists of rare and endangered species? This is a question the study will attempt to answer," Dr. Anderson said.

"CITES also wants to know the dynamics of the populations: Are they reproducing themselves? Are they threatened by humans through collecting or destruction of habitat? And what's happening to these populations—can we see changes in them over the three years?" he said.

Mexican botanists and students from CANTE will do most of the work, said Dr. Anderson, who assisted in the four-day workshop this May which established the scientific parameters and guidelines for how the study will be conducted. DBG personnel as well as interested botanists from around the world will also assist in the periodic field work.

The idea for the project arose two years ago

when Dr. Anderson and Ger van Vliet, plants officer for CITES, were on a side trip to see a volcano in Sicily following a professional meeting.

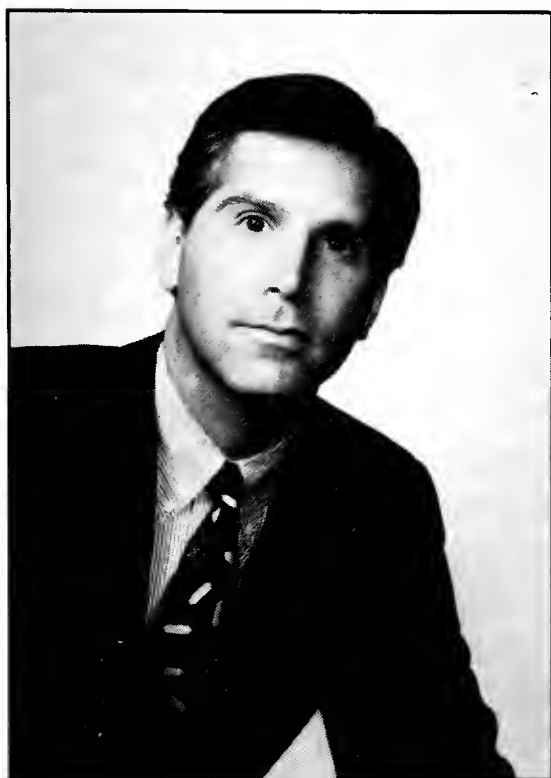
"We were chatting and I mentioned the great need to study these populations over a period of time. He liked the idea and wrote the grant proposal," Dr. Anderson said.

CANTE is located in San Miguel de Allende, in Guanajuato, Mexico. A nonprofit association, it is dedicated to the conservation of the natural and cultural resources of Mexico. Its principal facilities include a botanical garden, natural park and arboretum, an orchidarium, and a 270-acre conservation area in the Los Picachos mountain range. CANTE, established in 1987, also sponsors research projects and conservation actions in the arid zones of Mexico.—Carol Schatt ♦

Enjoying the Garden Party



Virginia Ullman (center) chats over refreshments with Nancy Swanson, Garden Trustee, and her husband Robert. The event was a summer gathering of Saguaro Society members touring Desert House and enjoying music and an elegant buffet on a beautiful evening.



Stephen Roman to Head Board of Trustees

Stephen Roman, senior vice president-corporate relations for Bank One Arizona, has been appointed president of the Desert Botanical Garden Board of Trustees.

Roman has been a member of the board of trustees for two years and a member of the board's executive committee for one year. His term as president runs to May 1995. He succeeds Barry Robinson who has been transferred to Miami, Florida.

Among his civic activities Roman has served as co-chairman of the COMPAS (Combined Metropolitan Phoenix Arts and Sciences) Black Tie fundraising event, immediate past chairman of Touchstone Community, Inc., board member of Valley Leadership, board member and chairman of the finance committee of Kids Voting, advisory board member of KAET-TV, and member of Harmony Alliance.



WISH LIST

If you have an item you believe would be useful, please call the Garden at 941-1225 for more information.

- Heavy-duty gloves
- Trash cans
- Two-gallon water cans
- Safety cones/barricades
- Tackle boxes
- Five-gallon buckets
- Fill dirt, large amount
- Three-ring binders
- Office chairs
- Ceiling fan
- Four-drawer, legal-size filing cabinet
- Electric fans
- Plastic tarps
- Large floor heaters
- Metal or plastic book ends
- Pick-up truck
- Blender
- Small bar refrigerator
- Window air conditioner
- 386 or 486 IBM compatible computer

Checking Out Desert House



Lisa (left) and Desi Rhoden hear about Desert House from Mary Irish, Garden director of public horticulture, at a summertime social event for Agave Century Club members. The event featured desert cuisine and entertainment, as well as a special tour of the demonstration house before residents moved in.

Someone to Know

10

Director's Life Always One Of "Kaleidoscopic Encounters"

Robert Breunig, executive director of the Desert Botanical Garden for nearly nine years, has accepted a similar position at the Santa Barbara Museum of Natural History in Santa Barbara, California. Robert leaves the Garden with deep regret, but also with eagerness to take up a new challenge. He will begin his term as executive director at Santa Barbara on October 3.

He has worked in museums since he was hired at age thirteen as office boy at the Children's Museum of Indianapolis, his home town.

"Part of my job was to mimeograph financial statements and board minutes," he said. "That's really when I learned how museums work," he joked. "I also did tours and exhibits, worked in the museum bookstore and gift shop. I did everything, including mopping the floor."

That job lasted weekends and summers until Breunig had finished two years of college at Indiana University in Bloomington. During the rest of his undergraduate days he worked at I.U.'s anthropological museum. He received a bachelor of arts degree from I.U. in 1968.

In 1973 he received a doctoral degree in anthropology from the University of Kansas at Lawrence, while doing field work on the Hopi reservation in northern Arizona. From 1972 to 1974, he was an assistant professor of anthropology at Northern Arizona University in Flagstaff.

In 1975 Dr. Breunig returned to Arizona, after a year of visiting professorships at the University of Connecticut and Denison University in Ohio, to work at a third museum, the Museum of Northern Arizona in Flagstaff. Hired as that institution's first director of the education department, he instituted the first educational programs there and became curator of the museum in 1977. His major job during this period was to reinstall the museum's keystone anthropological exhibit which is still on display. In 1981 he moved to the research side of the museum as curator of anthropology.

From 1977 to 1982, Dr. Breunig collected

pottery, jewelry, baskets and weavings for the Museum's traditional summer Hopi and Navajo shows. (The shows were established in the early 1930s by Mary Russell-Ferrell Colton, one of the Museum founders.)

"It was a wonderful experience, going door to door on the Hopi reservation, getting to know almost every household. There was a long tradition of collecting for these shows, so the people would be waiting for me with stacks of baskets; we'd sit in their houses and talk.

"The Navajo reservation is so large that I went to the trading posts instead of the individual hogans, and met the rug makers there. We would spend days out on the reservation, camping out in the remote canyons with thousands of dollars worth of rugs."

In 1982 Dr. Breunig became chief curator of the Heard Museum in Phoenix where he directed the development of the museum's permanent exhibit, "Native Peoples of the Southwest," which showcases pieces from its collection in a 12,000 square-foot building constructed especially for that exhibit.

The Heard was eager to open this major exhibit, and did so only two years after putting Breunig to work on it. "People ask me how it could have been done so fast," Dr. Breunig said. "I always say it felt like being shot out of a cannon. Our work on the exhibit in the summer of '84—it opened the following October—was intensive. We worked literally day and night putting it together. I loved it, I really did."

In late 1985, Dr. Breunig became executive director of the Desert Botanical Garden.

"It was really an accident," he said. "The Garden was looking for a director; they had done a national search looking for the perfect combination of botanist, administrator, and visionary.

"In casual conversation with a Garden trustee, I said it was too bad I wasn't a botanist because I felt the Garden had so much promise and I would apply for the job (if I were a botanist). I did not think that comment would be taken very seriously, but somehow I was asked to apply; and between the Board and me a real connection devel-

oped between our ideas about where the Garden ought to be going."

Concerned that some might question whether someone not in the discipline should be running a botanical institution, Robert was determined "to make the horticultural and botanical programs here the best I could. That's why I invited Gary Nabhan to head our research department." (Nabhan, an ethnobotanist and MacArthur Fellow, continues his research and writing from Tucson, Arizona. He is succeeded here by Dr. Joe McAuliffe.)

"I feel very comfortable in the fact that the Garden is an accredited museum. Whether you are dealing with art, artifacts, or plants, the same principles organize an institution; if you understand these principles, you can run the institution successfully.

"I believe the living collection is the foundation of this institution. If it is not well maintained, you cannot do research. A good collection is at the core of the Garden.

"I came here because I saw a wonderful place that I loved, a place full of potential and unappreciated by its larger community. When I took this job, some people in Phoenix thought I would be moving to Tucson!

"I wanted to change that. I wanted to try to help the Garden reach its full potential as one of the great botanical gardens of the world. This collection is one of the most important in the world, and I wanted to bring that out."

Prior to Breunig's directorship, the Garden was maintained in a "natural" state with minimal pruning and raking. "We should remember that this is a human-created collection, however," Breunig said, "not a natural growth of plants." He promoted C  zar Mazier, a horticulturist and agriculturist, to head the horticulture department. "We began to *tend* the Garden a lot more. We began to lift up the tree canopies and found wonderful collections of cacti underneath. We began to save a lot of plants, too."

"I am proud of the excellent condition which the collection now enjoys," Dr. Breunig said.



It's all in a director's day's work! The directors of five nonprofit organizations auctioned themselves as chefs in a recent COMPAS (Combined Metropolitan Phoenix Arts and Sciences) fundraiser. The quintet sold two dinners at \$3,500 for each. Four directors warming up their culinary skills are: (from left) Marty Sullivan of The Heard Museum; Robert Breunig, Desert Botanical Garden; Warren Iliff, Phoenix Zoo, and Connie Kloh, the Phoenix Symphony. This year COMPAS presented \$130,000 to each of the five institutions, including the Phoenix Art Museum.

He cites other goals the Garden has achieved during his time here:

- The collection has been thoroughly assessed and careful plans made for its long-range care and development;
- The plant conservation program, in which the Garden participates with other gardens and arboreta across the country as pioneering "Noah's arks" for saving endangered species, had just started when he came and has become one of the best in the country;
- The research program has expanded with additional scientists and diverse projects;
- New exhibits (such as *Plants and People of the Southwest Trail*) and educational programs have been developed;
- The Garden's infrastructure has been improved and the restoration of Webster Auditorium completed.
- The Fleischer Propagation Center was constructed.
- A public horticulture program was developed.

"The test is, are the institution and the collection in better condition now? I think they are," Dr. Breunig said.

Dr. Breunig wants the Garden to continue improving its facilities, buildings and collection, extend even further the reach of the educational programs, and build long-term financial stability
(Please turn to page 17.)



In Print

Two New Volumes Elucidate Cacti from Southern Climes

Eriosyce (Cactaceae): The genus revised and amplified
By Fred Katterman

Volume 1 of the series *Succulent Plant Research*, edited by David Hunt.

176 pp. England: Royal Botanic Gardens, Kew, 1994.
\$39.95 paper.

Reviewed by Jane Cole

There are thirty-three *Eriosyce* species, a woolly-bristled plant in the Cactus Family that inhabits Chile, Peru, and Argentina. Fred Katterman, amateur botanist, has studied most of them. Many of them are plants long known in the trade, but by different names, so Mr. Katterman's list of synonyms is a great help. Readers who collect *Echinocactus* species or *Echinopsis* species may discover that their plants are probably *Eriosyce* species. The photos don't describe all thirty-three of these plants, but are an excellent addition.

Threatened Cacti of Mexico

By Edward F. Anderson, Salvador Arias Montes, and Nigel P. Taylor

Volume 2 of the series *Succulent Plant Research*, edited by David Hunt.

135 pp. England: Royal Botanic Gardens, Kew, 1994.
\$39.95 paper.

Reviewed by Patrick Quirk

This book is a compilation of plant status reports on fifty-two species and varieties of cacti occurring in Mexico. Each report consists of the name and synonymy (other scientific names applied to a species) of the plant and its description, geographical distribution, abundance in habitat, habitat description, as well as an assessment of threats to its survival. This culminates in a recommendation of an appropriate International Union of Conservation of Nature (IUCN) ranking describing its degree of endangerment.

The sections on each plant are short and to the point, with no excess verbiage. The whole work

is characterized by thoroughness and precision. Also notable are the honest assessments of the degree of danger to each plant, ranging from safe to endangered. Knowledgeable cactophiles will be gratified to know that the information presented is the very latest available. The book contains color photographs of most plants described, but unfortunately not all. Perhaps this is because some are unavailable, for some of the plants are little known.

The final portion is a discussion of cactus propagation by the Italian manager of the International Organization of Succulents (IOS) genetic reserve collection, Andrea Cattabriga. Included as methods for propagating threatened Mexican cacti, the techniques explained will serve to propagate all species of cacti. On the whole this portion of the book is good and all the methods mentioned will work. Propagators may fail to see their favorite techniques cited, but I feel that this does not detract from the book's value.

This book will be useful in any succulent grower's library. ♦

(Jane B. Cole is the Garden librarian. Richter Library is available on weekdays to Garden visitors and for phone reference at (602) 941-1225.

Patrick Quirk is a horticulturist specializing in cacti at the Desert Botanical Garden.)



Detail of *Echinocereus pulchellus* on the cover of *Threatened Cacti of Mexico*, Royal Botanic Gardens photo.

"Bank of America is proud to help bring the Desert Botanical Garden's 17th annual Noche de las Luminarias to the people of our community."



—Mary Nasset, Executive VP & CFO
Bank of America Arizona

Luminaria: Here's the Info on How to Enjoy Nights of Lights

By Donna Johnson, *Luminaria* Chair

Planning for *Noche de las Luminarias*, the Garden's annual winter event when its trails glow with the soft lights of more than 7,000 luminaria, is underway. The event is presented this year by the Volunteers in the Garden and Bank of America, an enthusiastic new partner in the event which is providing a generous contribution of money and people to work with the Garden Volunteers. We extend them a sincere welcome.

Garden members planning to attend this popular event will want to know the following:

Dates: Dec. 1, 2, and 3, from 5:30 to 9:30 p.m.

Ticket Prices: for members: adults, \$4; children 5-12, \$2; for non-members: adults, \$8; children 5-12, \$4. All children under 5 are free.

Tickets sold on advance purchase only:

Mail orders from members will be accepted after Sept. 1. Use the green ticket order form inserted into this issue of *The Sonoran Quarterly*. Phone orders can be made by calling the Garden at 941-1225. Credit cards accepted are Visa, MasterCard, Discover Card, and American Express.

Non-member tickets: Available through Ticketmaster locations Valleywide beginning Oct. 15. Outlets include Warehouse, Tower Records, Robinsons-May Department Stores and Luke Air Force Base. Service charges are added to price of tickets.

Tickets for members and non-members will be sold at the Garden near the admissions booth between 9 a.m. and noon daily, Nov. 1 - 30.

No refunds due to rain. Your ticket will not be honored on another evening of *Luminaria '94* due to the size of the attendance. It can be used, however, as one adult general admission to the Garden through Dec. 31, 1995, **excluding *Luminaria '95***.

Order tickets in advance as the event usually sells out. Any unsold tickets will be sold at the door for \$10 for adults, \$5 for children 5-12. **GET YOUR TICKETS EARLY!**

Parking will be at the Phoenix Zoo with free shuttle service to and from the Garden. Parking for

those with physical disabilities and members of the Saguaro Society will be available in the Garden's north parking lot. A van will also be available at the zoo for persons with physical disabilities.

Serrano's Mexican Food Restaurant will offer a Mexican food buffet from 5:30 to 9:30 p.m. A new serving system will reduce the lines. Food tent purchases will be by cash or check only. **Credit cards cannot be used.** ♦

Want to be a Docent? We Need You!

If you love to talk about the Garden, the docent program needs you!

Garden docents are those outgoing people who guide tours through the Garden, explain concepts at the investigation stations, or "float" through the Garden wearing "ASK ME" buttons. They are the volunteer educators who help desert visitors as well as local residents understand more about the desert and its plants.

The Garden provides all training necessary to become a docent: the prerequisite core class for volunteers, which is a seven-week course in desert ecology (a new class will begin this mid-September); and a specialized course in docent skills, a four-week class in January.

The Garden hopes to increase the number of docents from eighty to almost double, and expand their programs to afternoon tours, evenings and weekends. For more information, call Pat Smith at 941-1225. ♦

Fall Book Sale: *Second Annual Planned*

A second annual sale of used books will be held at the Fall Landscape Plant Sale, Oct. 21, 22, and 23, according to Jane Cole, Garden librarian, who invites Garden members and friends to "bring me your books, yearning to be sold!"

Book donations may be left at the admissions booth at any time. Please include your name and address so the Garden can thank you.

Proceeds from the used book sale benefit the Garden library. ♦



Desert Gardener

Summer Shade Is Like Magic, A Miracle-Drop from Leaves

By Mary F. Irish

My hand is steady, but it causes earthquake movements under the magnifying glass. The fine pin I'm using to maneuver the leaf looks like a clumsy, blunt rod. Under magnification, insects otherwise invisible race to hide among white leaf hairs lying like seaweed over the leaf surface. The leaf hairs are so fine as also to be invisible without the magnifying glass. Tired, I lay the glass aside and see that the leaf itself is also very small, just one of thousands on a bush dalea, *Dalea pulchra*.

This delicate adjustment to observation—into the glass and back out again—is just a glimpse into the intricate life of leaves. But my magnifying glass is not powerful enough to peek into the other layers of life in leaves. And this is where all the action is.

A dance of sunlight, carbon dioxide, and water

Tiny cells, chloroplasts colored green from chlorophyll, are imbedded throughout the leaf. It is in these minute areas that sunlight, carbon dioxide, and water meet to perform the chemical fandango known as photosynthesis. That process, of course, spins forth sugars which fuel the intricate web of growth, flowering, pollination, fertilization, and seed development.

Neighbors to the chloroplasts are minuscule openings called stomata, which are the open windows to incoming carbon dioxide and outgoing oxygen and water. Usually open all day, stomata symbolize the dilemma of desert plant life: The rituals of life must continue, but steady water loss puts the life in jeopardy. In arid, hot lands, water replenishment is limited; "normal" water loss quickly becomes a one-way faucet through the stomata.

Desert plants have evolved a host of adaptations to deal with this predicament, and we are familiar with some of them: Small leaves to reduce surface mass, waxy coatings and thickened cuticle

to retard water loss, a galaxy of hairs to cover and cool the leaf, the relocation of chloroplasts out of the leaf to allow leaves to be temporary, and—most dramatic of all—storage cells to contain water within the leaf for use in times of drought. A plant rarely uses only one of these paths at a time; which combination it chooses drastically affects the way a plant looks and also the way in which we take care of it.

Mesquite, palo verde, ironwood and acacia trees are highly valued for shade in this Salt River Valley. Most plants thrive under their cover. One reason shade feels so good is due to the factor of water loss, perhaps troublesome to the tree, but beneficial to plants beneath it. All those minute openings in the leaves of the trees act like tiny coolers, chilling the air slightly as water evaporates. The light shade cast by these trees is a function of their incalculably numerous, tiny leaves—leaves small enough to help control water loss.

A green bark to substitute for leaves

Palo verdes (*Cercidium* species) are beloved for their sculptural form and green bark. To the advantage of the plant, however, the green bark is a shrewd gamble that the work of photosynthesis can continue without leaves. Of course, for gardeners this means beauty, low water needs, and a lot of shade.

Grey-leaved plants such as brittlebush, artemisia, and dalea, are soothing in the garden and are frequently used to visually calm and cool a planting. This winsome coloring is not due to pigment, but to the accumulation of fine hairs on the leaf surface. These hairs shade and cool the surface, preventing some measure of water loss.

Hairs come in a sensational array of styles: straight, bent, curved, starburst, matted. Brush a leaf of brittlebush (*Encelia farinosa*) too roughly and you remove the hairs. The leaf hairs on brittlebush vary widely in color from light grey-green to nearly white. Many gardeners have noticed that brittlebush slightly stressed for water are whiter, while brittlebush grown with a steady water diet have long, lushly green leaves.

Plant leaves respond in other ways to grow-

ing conditions. Wolfberries (*Lyçium* species) usually lose every leaf as the summer heat begins unless they have water regularly available, in which case they don't lose their leaves. And generally among all species, shade-grown plants produce leaves longer and broader than those grown in full sun.

Some little leaf weirdnesses . . .

Others, like boojums (*Idria columnaris*), are not so flexible. Their leaf loss, the result of dormancy, is extremely difficult to reverse. A near relative of boojums, the ocotillo (*Fouquieria splendens*), can put leaves on and shed them in a matter of a few days. In a botanical slight of hand, ocotillo's primary leaves transform from their spoon shape to the thorn within a season.

Generally, leaves are somewhat ephemeral organs in a plant. Almost all plants replace their leaves annually, sometimes all at once (deciduous), sometimes gradually through the year (evergreen). But many succulents, including agave, keep their leaves for a very long time. These plants keep their leaves for many years, even decades, before at last withering and dying. It is not unusual for an agave to live, bloom and die with the same leaves which have developed throughout its life.

As I turn back to the magnifying glass, the rough lunar surface of a cordia's leaf sharpens into focus. I wonder how such enormous burdens of life can be carried by such diminutive actors. A hole too small to be seen cools my garden; hairs too fine to trace create the colors of the desert. ♦

(Mary F. Irish, our Desert Gardener, is director of public horticulture at the Garden.)

(Leaves shown on these pages are *Merremia aurea*, yuca vine leaves, growing on the Garden's Eliot Patio.)

A New Year's Eve Party In September!

The Desert Botanical Garden will present a Fiscal New Year's Eve Party in September to celebrate the start of a new financial year.

The fund-raiser, to be held from 7:30 to 11:30 p.m. on Friday, Sept. 30, will include dinner catered by five of the finest restaurants in the Valley, dancing under the starlit sky, and entertainment by two bands, one featuring Brazilian music for dancing and the other a jazz group.

Also available for party-goers will be the chance to win a trip to San Francisco, unique items for purchase, and an unusual gift tree filled with grab-bag gift awards.

Tickets to the event are \$50 per person and may be purchased at the Garden or by phone (941-1225) with a credit card. ♦

Fall Landscape Sale to Feature Photo Exhibition on Wildflowers

A juried wildflower photo exhibition will accompany the Garden's Fall Landscape Plant Sale, Oct. 21, 22, and 23.

The show offers Garden members the opportunity to enter their favorite wildflower photos in a judged competition, said John Nemerovski, a community relations volunteer for the Garden and instructor in photography.

Thousands of plants and seed packets will be for sale, and knowledgeable volunteers can answer questions about wildflower horticulture at the sale, said Mary Irish, director of public horticulture.

Deadline for submitting photos for the show is Oct. 7 at 5 p.m. Mounted (not framed) photos should be mailed or hand-delivered to the Garden admissions booth to the attention of Chuck Smith. Each photographer may submit up to six color prints, sized 5X7 to 11X14 and mounted to a maximum size of 16X20. Prizes will be awarded.

More information is available from Chuck Smith, director of community relations, 941-1225. ♦



Plant Profile

Odd and More-Than-Wonderful

Boojum Tree

Fouquieria columnaris

Even in the world of plant oddities, boojum trees (*Fouquieria columnaris*) are spectacular. Rising to eighty feet in nature, the main trunk, its pale, dimpled skin erupting in spiny, truncated stems, resembles a bristly brush. Floating at the top are pallid flowers, arranged as top knots on the plant. The trunk is much wider at its base than top, a conical inversion which gives it a homeliness at once endearing and bizarre.

Despite all these cosmetic limitations, boojums are magnificent plants, giants of the Baja peninsula, rising together in a dense forest shared with cardon (*Pachycereus pringlei*) and immense yucas of several species. Having little economic or ethnobotanical interest except to greedy collectors, these botanical leviathans have been left in their isolation for many centuries.

F. columnaris was given its familiar name in 1922 by Godfrey Sykes, a botanist at the Carnegie Institute Desert Botanical Laboratory in Tucson. Sykes, who knew Lewis Carroll's classic, "The Hunting of the Snark," is reported to have spotted the weird plant through his telescope and exclaimed: "A boojum! Definitely a boojum!" And so it became one.

The boojum is a member of a tiny family of other succulents, of which the most familiar is the ocotillo (*F. splendens*). All of the other members of the genus are somewhat shrubby, bearing no superficial resemblance to the boojum at all.

In a garden the boojum tree has long been coveted for its novelty and spectacular form. It is difficult in the home garden to find growing companions for such a plant, but that should not deter anyone from growing them.

Boojums are not difficult to grow, but fairly slow to achieve great size. In

nature, plants over fifty feet tall are estimated to be at least three hundred years old. Boojums do respond well to cultivation, however, and can be encouraged to grow more quickly. For instance, the two specimens which a homeowner recently gave to the Garden had grown fifteen feet in fewer years.

Here boojums are determinedly summer deciduous, rarely leafing out before September and more commonly in October or November. In wet winters, growth in one season can be impressive. My own plant grew a startling six inches during one January of profuse winter rains, and nearly ten inches over that entire season. It depends on the weather, but surely by the end of May the boojum will shed its leaves and return to the somnolence of summer.

Boojums usually bloom after summer rains in July and August, but in cultivation are somewhat more erratic and can bloom at almost any time. Seeds are tiny, flat and light brown, look more like chaff than seed. Boojums germinate easily, but must be nurtured carefully as seedlings to prevent severe drying out.

During the winter growing season, ample water encourages steady growth and good vigor. Drainage, however, must be excellent as standing water guarantees death. In the summer, plants over five feet tall rarely need supplemental water more



Boojums loom eerily through the fog in Baja, California.

than once or twice in the season.

Transplanting a boojum is a delicate affair. Three years ago we moved; I would not leave without the boojum. It was a daunting business to dig out and haul around a plant with one-inch-long thorns on stems covering the full five feet of trunk. But we did it, and the plant has taken a place of great prominence in our new garden.

The most favorable time to replant a boojum is in the early fall just before it leafs out. As with most succulents, its roots need to remain dry until they have healed. If it must be planted in warmer weather, or when dormant, shade it from the sun. The flowing capes of black shade cloth shrouding boojums at the Garden are testimony to the wisdom of protecting their thin skin from the fierce summer sun. Remove the cloth in autumn.

Although older boojums grow in full sun, young plants are best protected from the full blast of the sun. Place them on the east side of shrubs or bushes, under or alongside of larger shrubs; do not fear that they will outlive and outgrow their nurse plants as this is what you are hoping for.

Boojums are probably the most unusual plants we can cultivate in our gardens. In Spanish the plant is known as *cirio*, a candle. For us, far away from Baja, it is a taper lit in our gardens in remembrance of the maze of diversity of the Sonoran Desert and the compelling grandeur of even the most unlikely living thing.—*Mary F. Irish* ♦

(CONTINUED from page 11.)

through growth of the Garden's endowment program.

"I also hope that the Garden will remain strongly involved in plant conservation so no more desert species will cross over the bridge to extinction," he said.

"I have found every day in this place a new surprise and delight," said Dr. Breunig. "I park in the upper parking lot and walk through the Garden at least twice a day." Beyond that daily ramble, any possible routine dissipates in an "unending kaleidoscope of meetings and encounters. It has never been boring. I shall miss it very much."—*Carol Schatt* ♦

A Note on Our Director's Departure

In this issue of *The Sonoran Quarterly*, members become aware that the director of this Garden for the past nine years, Robert Breunig, is moving on to a new life in California.

All of us who knew him here and worked with him are enriched for having been a part of the Garden during his tenure. He led us to be more vigilant of our collection, more interested in our visitors, more concerned with each other, and more secure in how successful we could become.

We will remember him best as we nurture the rare plants so briefly in our care, when we turn our heads up toward the soaring top of the boojum or the cardon, while children jet through the paths searching for lizards, and as we let the gaudy glory of the wildflower beds overtake us. Good directors, like good friends, are not replaced, but form a foundation for the enduring future.

To Robert, we say: You left the Garden better than you found it, ensuring for it a finer future for your having been here. ♦

New Volunteer Core Class To Start

A new volunteer core class will begin in September. The class, a prerequisite for volunteers to work at the Garden as community relations ambassadors, sales greenhouse workers, horticulture aides or docents, is a comprehensive course in desert ecology and will be limited to sixty persons. Enrollment will continue through Sept. 15.

The class will begin Sept. 27 and will meet from 8:30 a.m. to noon each Tuesday and Thursday through Nov. 10.

To participate in this great learning experience, call Pat Smith at 941-1225, pay the class fee of \$15, and make sure your Garden membership is current. ♦

In Appreciation

The Desert Botanical Garden wishes to acknowledge the support of all of its 7,235 members. Recognized in *The Quarterly* are members of the President's Club, Director's Circle, Saguaro Society, Ocotillo Club, Agave Century Club, Desert Council and donations received from April 1, 1994, through June 30, 1994.

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Dept.
Pottery Paradise
Joanne Rapp Gallery
Jeff Reich
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Randall Schmidt
Jim Sudal
Gayle Timmerman

IRAs Make Smart Contributions

By Lee Baumann Cohn

Many people do not realize that the Internal Revenue Service imposes certain taxes on retirement benefits which are passed on to heirs. Benefits that are not consumed during life-time and can fall subject to this tax include funds from Individual Retirement Accounts (IRAs), pensions, profit-sharing plans, 401(k) plans, and deferred compensation.

It works like this:

In addition to normal estate taxes, retirement-benefit funds are also subject to income taxes. The tax applies to funds which would have been taxed as income if the decedent had received them before death. There also may be excise taxes on excessive distributions or accumulations. In the worst case, 55 percent estate tax combined with 39.6 percent federal income tax plus 7 percent Arizona income tax plus 15 percent excise tax approaches a total tax of **nearly 117 percent!** (Note that a spouse can defer the income taxes by rolling the funds into his/her own plan.)

Retirement-plan benefits are often a person's largest asset. Consider the example of Mrs. Loveplants, a widow, who leaves everything to her businessman son. Her assets at the time of her death are her home (worth \$150,000), investments and other assets of \$450,000, and the balance in her IRA of \$200,000. With her effective estate tax rate of 38 percent, plus her son's combined federal and Arizona income tax rate of 43 percent, the taxes total **64 percent!** And that is assuming no excise taxes are imposed.

If that seems excessive, then consider these assets first when writing your will and making charitable bequests. A charitable bequest of IRA benefits generally will escape both estate tax and income tax. If Mrs. Loveplants had left her IRA benefits to the Garden, instead of \$75,000 in estate tax plus \$54,000 in income taxes, there would be zero estate tax and zero income tax. The drawback? Her son would not receive the net \$71,000 after taxes from the IRA. But he still would receive the house, the investments and other assets, and the full \$200,000 would be put to good use by the Garden.

Your tax advisor can give you further details on your personal situation, or the Garden's Planned Giving Committee can prepare a personalized evaluation of your individual circumstances. For a confidential evaluation or bequest information, call Sherry New, director of development, at 941-1225. ♦

(Lee Baumann Cohn, a certified public accountant, is vice president of The Cohn Financial Group, Inc. She is a Garden Trustee and a member of the Planned Giving Committee.)



The Kids Had a Great Day, and Told Us All About It!

In early summer The Broadway department stores sponsored a special visit to the Desert Botanical Garden for 160 students from Thomas J. Pappas School for the Homeless, Kenilworth Elementary School, and Ann Ott Elementary School, all in Phoenix. The fourth- and fifth-graders received water bottles, sun visors, Frisbees, lunch and small plants.

Their responses were endearing. A sampling of what they wrote:

"Thank you so very much for the great time that I had yesterday at the botanical garden. You made me feel special and I liked what I learned about the desert plants and birds. The part of the day I liked best was when we saw big birds. I liked the eagle best. I liked the skunk tree. It smelled bad. Your friend, Bulmaro"

"Thank you very much for everything we did yesterday. Thank you for the things you did, and for

coming out there to be a volunteer. . . .One of the things I liked best was being with Connie. Thank you, Priscilla"

"Thank you for a great day of learning and fun. I will never forget your friendliness, and all of the special things you did for us. I learned that desert plants and animals are special, and I will always care about them. Your friend, Robert"

". . . .I also liked the trail walk and getting into the Indian hut. I'm going to give my plant to my mom. Your friend, David"

". . . .If I had the chance I would go again. Thank you from Steven"

". . . .I liked the lunch, the bird show, and doing a plant. Thank you, Jennifer, for being my friend. Sincerely, Manuel"

The students also received certificates officially declaring them to be Sonoran Citizens, protectors of the desert's plants and wildlife. ♦

Calendar Events

Music in the
Garden:
Sept. 25 - Nov. 13

Fiscal
"New Year's Eve"
Party
Sept. 30

Fall Landscape
Plant Sale
Oct. 21 - 23

Luminaria Tickets
On Sale
Sept. 1 - Nov. 30

Call the Garden at 941-1225 for more information.

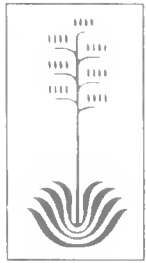


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THE



SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona
December 1994 - February 1995/Volume 48, No. 4





Garden's Board of Trustees On the Search for a New Director

By Stephen H. Roman
President, Board of Trustees

You might say that this summer was one of change at the Garden. I assumed the position of president of the Board of Trustees in mid-July due to Barry Robinson's transfer to Miami, Florida. A few weeks after I assumed the presidency, I learned that the Garden's director would be leaving on September 30th to begin in a new position as executive director of the Santa Barbara Museum of Natural History in California.

Although we are now in a state of transition while searching for a new executive director, the fundamental strength of our Garden is clearly evident. We are fortunate to have Carolyn O'Malley as our acting executive director and she has the full support of the Garden's Board of Trustees. Dr. Joe McAuliffe, head of the Garden's research department, will assume the role of principal investigator with responsibility for the National Science Foundation Grant, entering its third and final year. Finally, our experienced professional staff and dedicated corps of volunteers will ensure continuing progress in all phases of the Garden's important work.

We have put together a blue-ribbon search committee to find a new executive director for the Garden. I am chairing this search committee, which consists of present and past board members. I'd publicly like to thank the following members for contributing their time and resources to this very

important search. The committee members are: Cliff Douglas, Kate Ellison, Rose Papp, John Graham, Dr. Bill Huizingh, Nancy Swanson, Leslie Borgmeyer, Brad Endicott, Penny Howe, Fritz Steiner, George Tyson, and staff members O'Malley and McAuliffe.

The search committee first met on August 16th to outline the qualities we believe our new executive director ought to possess, most important being that this person be an outstanding manager. A process for this search has also been developed. We want to take our time and ensure that we have made the right choice for executive director, not just a quick choice.

It should be noted that many high-level candidates from around the country have already shown interest in applying for our executive director's position due to the national and international reputation of the Desert Botanical Garden. We expect to have a new executive director in place early next year.

Meanwhile, should you have any suggestions or recommendations, please contact me through the executive director's office at the Garden.

It is our hope to begin interviewing before the end of the year and fill this critical position with care. We have an opportunity to take another giant step forward following those achieved under the leadership of Dr. Robert Breunig. Wish us well! ♦



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ABOUT THE COVER:

More than 7,000 luminaria will bathe the Garden trails in soft, Southwestern candleglow during the evenings of December 1, 2, and 3. Eleven thousand people are expected to attend this event, a Valley tradition for seventeen years. *Photo by Pam McCarroll.*



Applied Horticultural Research at the Garden Helping to Answer an Old Question: How Does a

Horticulturists at the Desert Botanical Garden are developing successful, new solutions to old problems: how to grow desert plants.

They have learned, for instance, how to transplant and grow massive saguaros with a remarkably high success rate. They have learned how to grow wildflowers and control the grasses that would jeopardize the wildflower displays.

These examples of applied horticultural research grew out of frustration with old, hit-or-miss solutions to desert horticulture problems, according to César Mazier, superintendent of horticulture at the Garden.

Information has been generated about the techniques of growing plants, he said, "but much of it was not generated here, and you just know it doesn't work.

"The problem we had been facing was a lack of information about growing many of our desert plants. There is some research, of course, and it's very interesting. But we have a lot of plants and so we have a lot of questions about their culture.

"There's not much research about the horticulture of saguaros, desert wildflowers, or native plant materials," he said. "This leads to frustration.

"So we use the scientific method: you have the problem, you make a hypothesis, you test it, you collect results, and you make conclusions."

In addition to developing new techniques for the successful transplanting of huge saguaros and for the control of weeds in wildflower beds, César's other projects have included:

- How to root cuttings of boojum trees, and the arms of cardon and saguaro cacti;
- How to deal with the drainage problems occurring when large trees are planted in soils so rocky as to resemble granite boxes;
- What is the best soil mix for the collection's potted cacti;
- What is the best medium in which to grow massive cacti;
- How to provide drainage which allows plants to get a sufficient drink and still easily drain irrigation water away;
- How quickly the Garden soils dry out and what sort of watering schedules can best accommodate the plants;



About 35 to 40 employees of Motorola seeded the Garden's wildflower beds this fall on an October morning. They finished covering the two acres of flower beds with the white, synthetic bird protection material just as rain began to fall. The effects of organic and inorganic fertilizers on wildflowers are being tested in the beds now.

Plant Grow Best?

- Is the north side of a saguaro really cooler and is it important to orient the plant in the same direction when transplanting it; and

- Use of bacteria to eliminate chlorosis in eucalyptus trees and improve their growth.

César, who worked as a horticultural research scientist in his native Honduras, impresses upon his horticulture staff here the need to observe, to study, and to test their methods of growing plants.

"You can say, gee, these desert plants don't need anything more than what nature gives them. But the spirit of the horticulturist is to make you look for the ways to make these plants the most beautiful.

"And we do have failures. They're good. We

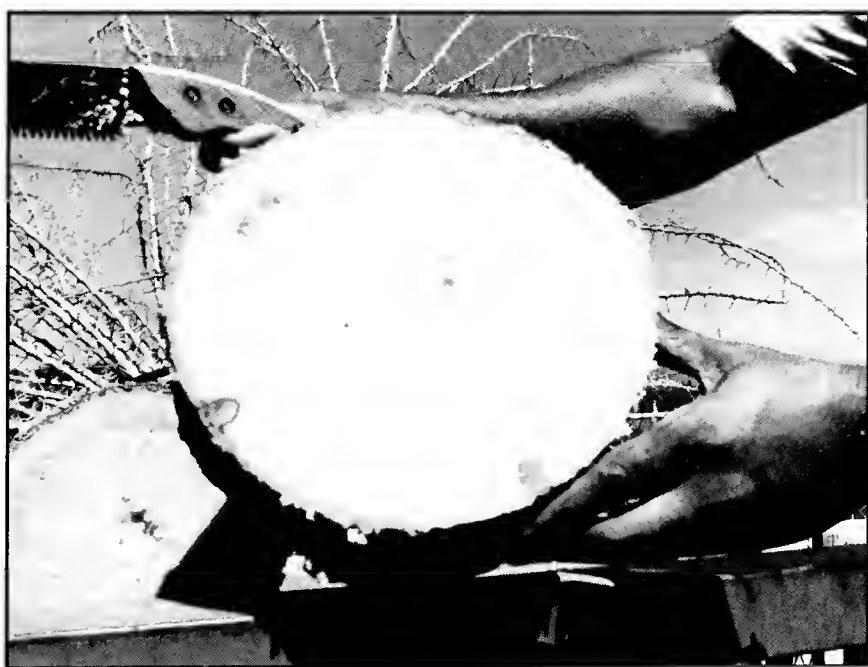


Photo by Chuck Smith

Cuttings from boojum trees have been rooted with a high degree of success in a sandy medium with weekly watering and protection from sun.

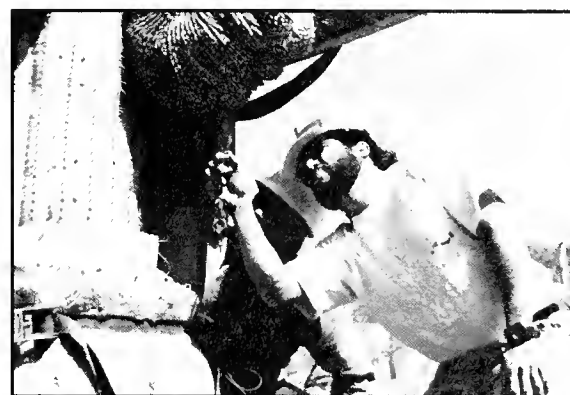


Transplanting large saguaros has been successful at the Garden if the cacti are replanted at their original depth, supported with straps and stakes, and watered thoroughly until the plants become established.

learn just as much from our failures."

The next study, already being planned, is to test organic and inorganic fertilization on wildflowers and to see how the flowers perform in different media. Also pending is a study of the impact of grey water (water which is captured from household use such as laundry and recycled for irrigation) on desert plants.—Carol Schatt ♦

César Mazier checks the straps which will hold this huge saguaro in place as it is being moved.



The "H" Team: They Keep the Garden Growing

It may sound simple, but it is basic: The horticultural staff keeps this botanical garden alive.

"They culture, they maintain this garden, this collection," said their boss, César Mazier, superintendent of horticulture. "Without these people the Garden would decline.

"They make it possible that people—architects, landscapers, people in horticulture, people who are interested in plants—can come here to see what these plants look like. They don't have to go to Baja or South America; they can come to this garden in the middle of Phoenix. The only reason they see something beautiful is that behind these plants are these people, these horticulturists, who make the plants beautiful."

César remembers telling Robert Breunig, former Garden director, "This is a botanical garden. We have to keep a collection alive. We have to maintain the integrity of each plant. But as a garden we have to make each plant look its best." It was then that the Garden changed its former philosophy of leaving many plants in their "natural," ungroomed state.

Being a part of the horticultural staff at the Desert Botanical Garden is not a soft job. Not only does the hort staff feed, water, prune, and culture the thousands of plants in the collection, but their job often means hard labor on the Garden's hardscape.

- This summer they unloaded 75 tons of stabilized granite and spread it over 2,000 linear feet of Garden pathways.

- They re-established the rock borders lining the Garden walkways.

- They relocated a great portion
(Please turn to Page 8)



Cathy Babcock, who grew up in Phoenix, has a degree in urban horticulture from Arizona State University. She has worked at the Garden for five years and is in charge of all succulents except cacti and agaves.

Cathy's favorite spot at the Garden is the Succulent House "because they're my plants in there, and it's not so hot and deserty, it's more lush and green. And of course it's shady."

How does she stand the summer heat? "It is true that you do get used to it. But I think we just wake up knowing we're going to be working outside, and we just accept it."

"I have a jungle at home. I have my own collection of succulents under a shade structure. The first thing I did was take out the lawn and landscape with native plants and succulents, especially plants which attract butterflies and hummingbirds. Of course, it all needs work right now. It's a bit overgrown."

"The things I like most about my job are the plants and

the sunrises. Every day I see the sun come up; it's beautiful. And the friends I've made here.

"Another favorite thing—it may sound funny—is working outside. I had an office job as an accounting assistant for fifteen years before going back to school for my hort degree. And every day I yearned to be outside."

On a 1985 trip to California with her sister and brother-in-law, Cathy became caught up in their fascination with succulent plants. "That's when I really became interested in becoming a horticulturist. I had everything lined up to go back to ASU, but couldn't really decide to make the big switch in careers. Then I got laid off, so I went ahead and paid my fees and became a horticulturist."

Although she studied landscaping and urban horticulture, her real interest was in succulent plants, which is where she finally has wound up.

"I feel so lucky. This is the perfect job. It's just like one of those things that's meant to be." ♦

Michelle Winters, the gardener in charge of wildflowers, loves the volunteers who help her clean, plant, weed, and collect seed from the more than two acres of flower beds. "They're wonderful!" she says of the many hort aides who help her produce the traffic-stopping spring show of blooms.

Michelle, who is studying environmental plant science at Mesa Community College, came to work at the Garden 18 months ago after managing a Valley nursery for two years. She is a certified nurseryman and a Master Gardener.

Phoenix is her hometown and she has learned to survive the heat "by dousing myself with water, and living in

long-sleeved shirts and big hats."

Michelle is also in charge of the plantings at Webster Auditorium, Eliot Patio, Ullman Terrace, "Hummingbird Alley" and the Rhuart Demonstration Garden near Archer House, which is "probably" her favorite part of the Desert Botanical Garden because "there is always lots of color there, always something happening."

At home Michelle grows herbs—lavenders (twelve varieties) and sages in a geometrically-planted "knot" garden in the front of her house and culinary herbs at the sides. She uses them in many herbal crafts such as wreaths, potpourris, and herbal vinegars. ♦



Horticulture staff photos by Chuck Smith



Mike Maira came to Arizona as a refugee from the weather in his home state of Ohio. Interested in life sciences, he earned a bachelor of science degree with horticultural concentration from Arizona State University. He has worked at the Garden for a year and a half.

In charge of the Cactus House and adjacent beds, Mike says cacti are a challenge, "a little hard to handle." His major fall project was planting out cacti from the propagation area into the expanded Cactus House as well as rearranging

some plantings. He also worked on the installation of the water fountain at the Weise shade island and is a major contributor when irrigation problems develop, both in fixing the problems and providing supplemental watering.

His favorite part of the Garden is the Rhuart Demonstration Garden in front of Archer House—"it's colorful, pretty, overgrown."

An apartment dweller with limited space, Mike's garden at home consists of five potted basil plants, one potted cactus, and a plumeria. ♦

(Continued from Page 6)

of the plant collection into geographically-themed beds more typical of the plants' global distribution.

- They replanted the Cactus House, replacing tons of soil, rebuilding display beds, replacing the roof and installing shade cloth.

- They installed major water and irrigation systems at Desert House, the Bean Student Orientation Grove and amphitheater, the Endicott Wildflower Beds, Ullman Terrace, and the Rhuart Landscape Demonstration Garden.

- They removed hundreds of plants along the main Desert Discovery Trail to enlarge the paths; they relocated and replanted these plants elsewhere in the Garden.

- With help from volunteers they planted more than 2,500 plants along the new entryway drive.

- They planted countless trees throughout the grounds.

- They remodeled the propagation area.

- They landscaped shade islands, rebuilt ramadas on the *Plants and People of the Sonoran Desert* Trail, and reconstructed the vegetable garden in the Rhuart Demonstration Garden.

"Some of these things are not the tasks of horticulturists," César said. "Under other circumstances where money is more available, we would probably not be the people to do these things. But when money is scarce and you feel you can do something, well. . . .

"I don't have any doubt in my mind to ask them to do these things. When they understand why, they do
(Please turn to Page 10)

Diane Barker began working at the Garden in 1985 as a volunteer in the first propagation class taught by Patrick Quirk and Victor Gass (former Garden staff). She was taking horticulture classes at Scottsdale Community College then and has since earned her horticultural degree in landscape horticulture at Mesa Community College. During that time she continued her volunteer work here, and was hired last fall to care for agaves and yuccas.

A native of New Jersey, Diane enjoys interacting with Garden visitors as well as the plants. She likes to find out "where the people are from, why they're here and what they think of the Sonoran Desert compared to where they've come from."

This past summer, her first in a profession requiring full-time duty outdoors, was not as difficult as she feared it might be. "Drink water and

find some shade once in awhile," she said.

How does she cope with the unavoidable pokes, scratches and bruises with which agaves reward those who care for them? "I have numerous scratches all over my arms and legs. You just deal with it," she said.

"I love the people I work with," Diane said. "I feel they are an extension of my own family. People who work with plants have special nurturing qualities. I learn something new every day about people, about plants, about the Garden—or about life," she said.

"At home," she said, "we were transforming our late-sixties' landscape of grass, pittosporum, and junipers into desert. In the summer we applied herbicide to kill the grass and removed the shrubs. The neighbors hated it. But after October it became much better." ♦



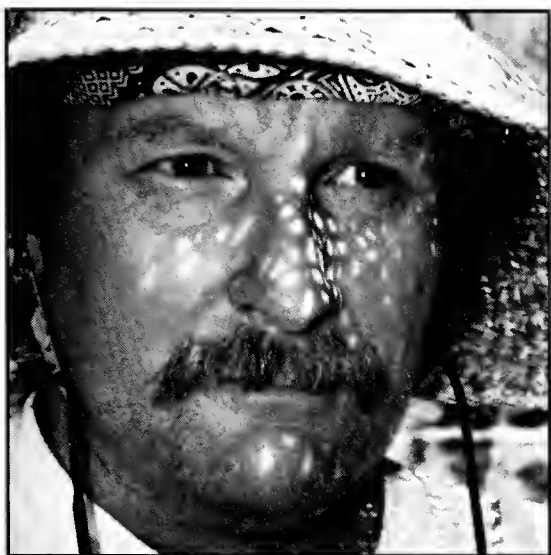


Photo by Carol Schatt

Patrick Quirk, a native of Chicago, is the horticulturist in charge of all cacti at the Garden except those in the Cactus House and adjacent beds.

His least favorite part of the Garden environment this summer was the rabbits who turned to the cacti for food in the hot, dry season. While many plants can recover from being chewed by rabbits, the damage rabbits inflict on cacti tends to be permanent, scarring and disfiguring, or even causing death to the plant.

Patrick has a horticultural degree from Kishwaukee College in Malta, Illinois. He has worked at the Garden for

sixteen years.

At home he is a minimalist gardener with "grass and a few plants. I like cactus well enough but I am not interested in going home and doing more. I really do not buy plants in pots. I was cured of that when I had the care of an over-stuffed propagation yard."

Patrick is also in charge of weather at the Garden—that is, he monitors weather reports and alerts the staff to frost and severe heat events. If he could do anything about the weather, he would order "more rain, light frosts only—just enough to keep the bugs down—and definitely much lower summer heat." ♦

Allison Yerger, born in Jackson, Mississippi, grew up in Phoenix. Her life has been a potpourri of studies and experiences involving her favorite interests: photography, plants, ecology, anthropology, martial arts, backpacking.

She has a bachelor of science degree in anthropology with a minor in photography from the University of Arizona; she also has an associate of applied science degree in environmental plant science from Mesa Community College. And she plans to enroll in graduate school at ASU to study landscape ecological planning. She is certified in permaculture design (a water-conserving and self-sustaining form of gardening) and is start-

ing to teach.

Allison is in charge of the *Plants and People of the Sonoran Desert Trail*. In the year she has worked here, she has built ramadas, planted the Hispanic and native crop gardens, rebuilt rock walls, planted many trees and shrubs, and is renovating many exhibits.

At home she grows vegetables and herbs, and shares with her father an interest in desert horticulture of tropical plants such as mangoes, papayas, sapote, bananas, avocados, coffee, and yuca. They grow these exotic plants at their home and are interested in talking to other people who grow such plants here. "We're writing a book on it," Allison said. ♦



(Continued from Page 8)

it. And they are not usually grouchy about it.

"One of the nicest things is that this is a team. It's just the perfect team. They help each other. Each one gets a big project to do, he or she gets help from the whole rest of the staff. When they work together they have fun; they tell each other stories.

"The Garden is lucky to have this kind of people around because they really care. I am lucky to have them working for me.

"They are good, they are really good."—Carol Schatt ♦

John Schluckebier, horticulturist in charge of trees and shrubs, came to Arizona from his home state of Michigan in search of better weather and a better job.

John graduated from Michigan State University with a bachelor of science degree in botany, and he is beginning a master's degree program, also in botany, at Arizona State University. He has worked at the Desert Botanical Garden for five years.

He copes with summer heat by wearing "one of these necktie things with water in them, and I drink lots of water and try to keep moving. If I can get indoor work, then I do that.

"Spreading decom-

posed granite is miserable enough work, but what I really hate is sweeping the greenhouse on Saturdays. It's always hot and dusty, takes forever, and I get poked with cactus spines."

His favorite spot in the Garden is near Pratt Ramada atop the Arizona flora trail. "The view is just great." ♦



Kirti Mathura is the public horticulturist at the Desert Botanical Garden. In charge of the sales propagation area, she propagates plants for the Plant Introduction Program and for greenhouse sales as well as the Garden's spring and fall plant sales. She also teaches frequent classes at the Garden on propagation, container gardening, vegetable gardening and other subjects.

"It's a never-catch-up game," she laughs. Her least favorite part of the job is "having to get rid of the plants that I've killed."

Kirti, who has a bachelor of science degree in botany and environmental biology from the University of

Montana, grew up in Michigan. She became interested in horticulture when she managed a tree nursery for the Forestry Extension Service in Costa Rica as a Peace Corps volunteer.

A job doing research in cotton genetics brought her to Arizona seven years ago. She has worked at the Garden for eleven months, and was a volunteer here for six years before that.

At home she grows herbs and vegetables.

Kirti directs about twenty volunteer propagation aides in the sales greenhouse program, and in the summer several high school and community college students work with her as volunteers. ♦



Kathleen Rice, daughter of a U.S. Forest Service supervisor, had never been east of the Mississippi River until this fall's Center for Plant Conservation (CPC) meeting at Holden Arboretum in Ohio.

Kathleen has always lived in the Southwest; now as horticulturist/botanist for the Garden's CPC program, she is helping preserve rare and endangered plant species of the Southwestern deserts.

"My purpose here is to generate a large number of seeds in propagation," she said. "This not only prevents these plants from becoming extinct but provides specimens for study without jeopardizing the wild populations."

She also hopes to test

the viability of frozen seeds compared to seeds preserved at room temperature. With the proper scientific equipment—a germination chamber—the results would be publishable, she said.

This fall she is conducting a salvage project on *Coryphantha scheeri*, possibly bringing specimens into the CPC collection at the Garden while working on developing a new habitat for the cactus in the wild.

Kathleen holds both master of science and bachelor of science degrees in botany from Arizona State University. Her master's thesis is a flora of the Superstition Wilderness area. She has worked at the Garden for six months. ♦



Photo by Carol Schiatt

Horticulture aides—"hort aides," as they call themselves—are the volunteers who work alongside the horticulture staff at the Desert Botanical Garden.

This hard-core group of dedicated gardeners, which ranges seasonally from about 35

to 40 persons, participates in most gardening projects. They prune, weed, water, weed, fertilize, weed, and in all ways, including weeding, help maintain the plants in the collection. They do not handle pesticides, and most don't climb ladders nor drive Garden vehicles. The *really*

heavy-duty work is performed by the horticultural staff but the volunteers are an important crew at the Garden.

"They give the last grooming to the Garden," said César Mazier, superintendent of horticulture. "They polish this place." ♦



Bring Those Aloes Out For Some Adventure!

By Mary F. Irish

There is something melancholy about plants kept in pots throughout their lives. Gardeners do grow plants in pots for many sound reasons, but some plants remain in pots just because they are not thought to be suitable for the ground. This too often is the case with aloes. The adventurous gardener will discover joys and rewards in cultivating aloes in the garden.

Aloes are leaf succulents from southern and eastern Africa, with a number of species originating in Madagascar. These plants are analogous to our own agaves. The two genera look alike: Both are leaf succulents, both usually lack stems, and both have large, long-lived leaves in rosette formation. They are, however, quite different from each other.

Blooming, the plants are easily distinguished. Aloes bloom in an intriguing array of styles: spikes; flattened, branching heads; tall, upright-branched flower clusters; or flowers held upright or turned to the desert floor. The blooms have striking petals, usually in brilliant reds, oranges or yellows. Agaves, however, generally bloom without the grace of petals, and in more subdued tones of yellow and occasionally reds.

Cut open an aloe leaf and you'll find it full of gelatinous tissue, whereas agave leaves are fibrous, tough, and rarely juicy.

But the easiest way I know to tell the two apart at any time is to look carefully at the margin of the leaf. In aloes what looks like teeth on the leaf margins are actually extended portions of the leaf. The "teeth" look like taffy pulled into tiny points. In agave leaves the margin is very different. Here a modified section of cuticle creates the sharp projectiles we call "teeth." A fine line is visible between leaf and "teeth," evidence of a change in tissue which does not occur in aloe species.

Whether you care to find these differences

or not, there are quite similar uses for the two plants in the garden. Aloes, however, offer the gardener three opportunities that agaves don't: some aloes grow extremely well and flower beautifully in dense shade; most aloes bloom in winter; and aloes bloom repeatedly throughout their lives.

One of the most difficult locations in a desert garden is the area of dry shade. These spots are found where house and wall are close together (particularly on the north side), where a deep overhang blocks direct sun, or where trees or shrubbery create a dark understory. These are places where many aloe species can brighten things up.

Aloe ciliaris, a vining aloe, does well in partial shade or on northern exposures. It needs support, such as an old tree trunk or a tree with an open branching style like African sumac (*Rhus lancea*). It will bloom extensively during the winter season and even improve with age.

A. variegata, or partridge breast, is a lovely plant for deep shade. The plant holds its speckled, lined leaves so tightly that it looks like an urn. It freely suckers from its roots, creating an extensive set in as little as two years. Blooms arrive in the winter and are light pink.

Other aloes tolerate a wider range of light, doing well in either deep shade or the partial shade offered by an eastern exposure or a tall tree. Many of these aloes aggressively create root suckers and can become effective and interesting ground covers.

A. chaubaudii and its various hybrids thrive in deep shade or partial sun. *A. chaubaudii*'s leaf is wider than it is long, often with light pink margins. The plant is not commonly available, but can occasionally be found.

A. saponaria is the ubiquitous aloe of public plantings. It grows in either shade or sun, and is excellent for filling in small spaces or larger areas. Its green leaves, heavily mottled with white, contrast stunningly with its reddish-yellow blooms. A close relative, *A. grandidentata*, is equally aggressive but offers red flowers. Both aloes are very cold hardy here in the Valley.

A. sinkatana is another low, ground-hugging aloe suitable for filling in space in partial shade. The leaves are narrow and lightly mottled. The



Tree aloes such as this *Aloe dichotoma* mature slowly but are striking specimens in the garden.

flowers are remarkable, being held in a circle at the tip of the blooming stalk and turned downward, giving the appearance of an inverted cone hat. The flowers bloom in two colors, a creamy yellow or a dark bright orange.

Aloes can be planted in beautiful contrast to blooming shrubs or low wildflower plantings in partial shade. *A. striata* is a gorgeous plant, long in cultivation on the West Coast. Over two feet wide at maturity, this aloe is best known for its smooth, light blue leaves outlined in pink. The species includes a number of hybrids, and all are lovely additions to a garden.

A. cryptopoda, when you can find it, is remarkable for its narrow, upturned leaves of a dark blue-grey cast. In winter this plant's scarlet red blooms, flaunted high above its leaves, arrestingly turn to yellow.

Smaller aloes such as *A. mitriformis*, upright with immense blooms for its size; *A. aristata*, an astoundingly symmetrical rosette of deep green leaves coated with white dots; and *A. brevifolia*, a compact plant with very blue leaves, are rarely used outside of containers. All of these would be exquisite planted out in a desert garden setting in partial shade.

The most common member of the genus is *A. vera*, one of the medicinal aloes. This aloe has the substance in its leaf so useful for healing minor abrasions and burns. This aloe is very aggressive and requires thinning every few years. Some people

prefer growing it in a container for this reason. As with mint, no house should be without an *A. vera*, but keeping it tame can be vexing.

The practice of growing aloes in shade has become a canon for some gardeners—one which begs to be challenged. A world of possibilities exists for the adventurous gardener who will move aloes out of the shade.

The front yard of a house in a neighborhood near mine has been given over to an eclectic collection of succulents and other desert shrubbery. This collection includes two species of tree aloe, *A. ramosissima* and *A. dichotoma*, both growing in full sun, with no protection from either the winter cold or the summer sun. They are beautiful, thriving in this little garden.

Tree aloes are an intriguing group within the genus; we would benefit from more experience with them here in the Valley. In addition to the two named above, *A. ferox* and *A. marlothii* are often available. All grow to be commanding plants in nature, but mature slowly. All are quite sensitive to summer watering. Too much water can produce insidious root rots and, occasionally, crown rot.

Protection against freezing is important to aloes. A few are very hardy, but most benefit from some degree of frost protection. For most winters, simple overhead protection such as that from a tree, an eave, or an overhanging porch is sufficient. When exceptionally cold temperatures are expected (below 24 degrees F., or below freezing for an extended period), more determined protection such as a frost blanket could be required.

Aloes are accepted into the culture of desert gardens in small and limited ways; but they might offer much more if we would give them more opportunity, experiment a little more with them. Perhaps the sun is not so harsh if there is sufficient water. Perhaps the cold is not killing if the plant has sufficient time to acclimate and is not kept wet. These and other horticultural questions arise all the time, awaiting answers provided by the continued rebellious use of aloes out of containers. ♦

(Mary F. Irish, our Desert Gardener, is director of public horticulture at the Garden.)



Plant Profile

14

Newcomer Offers Winter Dazzle to Smaller Spaces

Cascalote

Caesalpinia cacalaco

The genus *Caesalpinia* provides an array of dazzling shrubs and small trees for desert gardeners. Flamboyant blooms in reds, oranges, and yellows proclaim their tropical origins and offer brilliant color throughout the long warm season. Tolerant of extreme heat, alkaline soils, and drought, a number of caesalpinias are popularly used ornamentals in the Phoenix area.

Most members of the genus are warm-season bloomers. The red bird-of-paradise (*Caesalpinia pulcherrima*) so familiar to Valley gardeners, is glorious throughout the hot summer. Mexican bird-of-paradise (*C. mexicana*) and yellow bird-of-paradise (*C. gilliesii*) grace the spring and fall with lush yellow blooms. But the winter belongs to the cascalote (*C. cacalaco*).

Cascalote is a relative newcomer to horticulture in the Southwest. Although long held in a number of botanical garden collections including our own, it is just emerging as a well-used ornamental. A native of northwestern Mexico, this medium-sized blooming tree has a place in nearly every yard. Dark, circular, green leaflets and reddish-brown thorns similar to those found on roses distinguish cascalote from other caesalpinias. These thorns are particularly pronounced in young plants when both the thorns and the stems are a fine, dark red. As the plant ages the thorns widen, become woody, and eventually fall off.

Young plants are

multi-trunked shrubs and can look ungainly and awkward. But with careful pruning and time, the cascalote forms a tree. The plant blooms young, while still in the shrub stage, and will be a fine tree within five to ten years. Left without pruning, it is wonderful if there is enough room for its splendid size.

Capable of reaching twenty feet in height here in the Valley, the cascalote is a good choice for a patio or outdoor seating area. The dense shade relieves summer heat and offers excellent cover for shade-loving, smaller plants. Bloom begins in November with great two-foot-long, narrow spikes of clear, yellow flowers. From a distance the tree appears to be decorated with curving, yellow candles. Up close, the flowers are tight and waxy with a bright red spot on one of the yellow petals. Anyone would rejoice at the sight of these blooms reaching into the dazzling blue winter sky.

Cascalote is best planted in the fall. The plant is admirably suited for our desert soil conditions and needs little or no soil amendment. Newly established plants should be watered regularly and thoroughly through the first year, particularly in the first summer. Although very drought tolerant, plants will grow more readily and be healthier if regular summer irrigation continues through their lifetimes.

Not all patios or yards can accommodate a large tree such as palo verde or mesquite. If you find yourself with sommore restricted space, consider the cascalote for its combination of glorious winter bloom and delightful summer shade. —

Mary F. Irish ♦





Essays Extol Influences Of Nature on Children

By Jane B. Cole

The Geography of Childhood: Why Children Need Wild Places

By Gary Paul Nabhan and Stephen Trimble
184 pp. Boston: Beacon Press, 1994, \$22

This book of essays tells the stories of two naturalists' experiences finding satisfying careers in the world of nature. The writers "consider the influences that natural settings, native plants, and wild animals have on toddlers and teenagers. . . and are concerned about how few children now grow up incorporating plants, animals, and places into their sense of *home*." Reading this book may encourage parents, teachers, and natural history educators to create more outdoor opportunities for children.

In alternating essays Nabhan discusses the importance of the natural world to child development, followed by Trimble's story of his own Western childhood trailing after his geologist father, learning to read maps, memorizing the names of landforms, finding his place in the world.

Then Nabhan recounts ditching school on days when the wild birds were migrating, enjoying the out-of-doors around his home near the dunes of Lake Michigan. What a contrast he depicts between sitting at a desk in school and getting outdoors to explore!

Trimble discusses the historical and continuing shortage of women in careers as naturalists and the possible reasons for this lack. He cites Rachel Carson and others who did prove themselves despite difficulties in American culture which make an important gender issue of women working in the field of natural history.

Each author also looks at other ethnic groups: Nabhan studies the experiences of Papago Indian children (O'odham) in Arizona and Trimble takes a long and interesting look at the children of Basque shepherders in Nevada and their feelings

of place and tradition.

Finally, both authors conclude by following their own children and finding out what they can learn from them. Companionship, family, even the family dog make a difference.

When Gary Nabhan speaks of the dunes, the marsh, and the wildlife near his childhood home in Indiana, the reader can almost hear the sand squeak. When Stephen Trimble tells us about driving through the miles with his father to discover new trails, we become eager to join the trip. The authors also include an annotated bibliography of additional authors and sociological studies of children experiencing the out-of-doors. There is a lot of good information here.

The authors don't really answer "why children need wild places," but they do suggest that children need to participate in saving wild places when they grow up. In reality *The Geography of Childhood* promotes getting more adults involved in the land around them by getting them outdoors while they are yet children.

These two naturalist fathers have put together a remarkable book. It is a pleasure to read and brings with it the opportunity for the reader to reminisce about his or her own wild-nature experiences of childhood.

Children need only a small piece of wild geography—it can be under the back steps—but Nabhan and Trimble feel strongly that it cannot be electronic nor manufactured.

The Geography of Childhood is the latest in Boston's Beacon Press "Concord Library" series on natural history. Dr. Nabhan was director of research at the Desert Botanical Garden from 1986 to 1992. He and Stephen Trimble and their families have known each other for many years. ♦

(Jane B. Cole is the Garden librarian. Richter Library is available on weekdays to Garden visitors and for phone reference at (602) 941-1225.)

Acting Director's Road to DBG Included Europe, Volunteer Work



Carolyn O'Malley, acting director of the Desert Botanical Garden, is an energetic and enthusiastic advocate of volunteerism.

After all, she has worked as a volunteer in many parts of the world and for most of her working life.

"I lived overseas for many years—we moved sixteen times in fifteen years—and the first thing I would do when we moved to a new place was to find a job as a volunteer."

Those jobs were as diverse as overseeing an intensive care wing in a hospital in the Phillipines, teaching classes in Hong Kong, and working at the Bankside Gallery Royal Society of Painters in Water-Colours in London.

As acting director of the Garden, Carolyn says, "I would just like to maintain the integrity of the Garden as Robert left it. I visualize no major changes."

She expects the Board of Trustees' search for a new director to take four to six months.

Born and raised in Phoenix, Carolyn's twelve years in Asia and three years in Europe took her away from America's turbulent years in the 1970s, although annual visits home and the global news services kept her well informed on events in the U.S.

She loved living abroad but she loved coming back home even more. "I got to start my career at age 40," she enthused.

She brought her son home to Phoenix for his high school years. Born abroad, he was eager to experience at least part of an American childhood.

Once back in Phoenix, Carolyn again volunteered, this time at the Volunteer Center of Phoenix. Shortly thereafter she began her career as a paid employee when she was hired as public relations director for the Center. She stayed in that job for six years until November a year ago when she came to the Desert Botanical Garden as assistant director.

She holds a bachelor of arts degree in sociol-

ogy with a minor in art history from Whittier College in California and a master's degree in international management from the American Graduate School of International Management (Thunderbird).

Before going abroad Carolyn worked in the retail business in Dallas, Philadelphia, San Francisco, and Phoenix.

A member of the Junior League of Phoenix where she got much of her training as a volunteer, she is active in many community organizations including serving on the boards of the Salvation Army in Glendale, Phoenix Country Day School, and the Thunderbird Alumni Association. ♦

Eugenia Wright Estate Leaves Generous Gift to Garden

Desert Botanical Garden officials were gratified recently to receive a major estate gift from Eugenia I. Wright, a Garden member. Her estate plan included an immediate distribution to the Garden of \$75,000, her plant reference library, and a number of specimen plants. The plan also has a contingency for a further gift after the death of an heir who will benefit from the interest during her lifetime.

The first gift has been added to the Garden's operating reserve which is currently being built to ensure operating stability. The reserve holds \$150,000 at the present time and gifts will be added until it totals fifteen percent of the annual operating budget.

Helen Eker, a long-time friend of Ms. Wright, said Ms. Wright chose the Garden because of her love of succulents and desert plantings. "The Garden does such an excellent job in their displays that she wanted to help," Ms. Eker said.

The Garden is honored by this gift. Thank you, Ms. Wright. Your memory lives on in the good works and beauty of the Garden. ♦

New Shelf System Will Boost Library Storage Space

The Desert Botanical Garden's Richter Library book stack space will be increased by 80 percent due to a \$53,111 Garden project with support from the Institute of Museum Services (IMS), according to the Garden's development director, Sherry New. The IMS grant totals \$24,526.

The project includes a new shelving system as well as state-of-the-art conservation treatment of library materials.



WISH LIST

If you have an item you believe would be useful, please call the Garden at 941-1225 for more information.

Rectangular outdoor table
 Small wagon or cart
 Flower cart for display purposes
 Large clay or stone pots
 Blender
 6- or 8-foot fiberglass ladder
 36" water wand
 IBM Selectric typewriter
 Legal-sized four-drawer metal filing cabinet
 Oscillating fan
 Box fan
 3 1/2" computer disk storage trays
 30" x 60" wood office desk
 Secretarial chair
 Two office side chairs
 Upright freezer
 Paper cutter
 Global positioning system
 Brunton compass
 Flatware service for 50 persons

In Phase I of the library collection conservation plan, six mobile track compact shelves will be installed in the library reading room. The shelves will better protect library reference materials and also make them more accessible.

During Phase II the library collection will be assessed from the viewpoint of conservation of materials. An order of priority will be assigned to materials to undergo conservation treatment and staff will be trained in conservation techniques and strategies.

In the project's final phase, old, fragile and valuable materials in the collection will undergo conservation treatment.

This special library collection includes 10,000 volumes, many of them one-of-a-kind, including extensive rare book and botanical art collections. Richter Library supports research in the Garden's living collection and herbarium collection and is used by Garden staff and consultants as a source for information on the evolution and natural history of desert plants, ethnobotanical documentation, and ecological systems of desert plant communities.

The IMS grant makes possible the implementation of the third segment of a long-range general conservation plan developed by the Desert Botanical Garden in 1989. Conservation of the living plant collection was addressed in a conservation project in 1990-91 and conservation of the herbarium collection was implemented in a conservation project in 1992-93. All three projects have been partially funded by grants from the Institute of Museum Services.

In addition to serving the Garden research staff, the Richter Library reading room also receives about 4,000 of the Garden's 220,000 yearly visitors and handles an additional 9,000 requests for information by telephone and mail.

While the grant money is important, additional support of the library conservation project is provided by Garden donors and members, corporate gifts, and memorials. — Chuck Smith ♦

In Appreciation

The Desert Botanical Garden acknowledges the support of all of its 7,173 members. Recognized here are members of the President's Club, Director's Circle, Saguaro Society, Ocotillo Club, Agave Century Club, Desert Council, and donations received from July 1, 1994, through September 30, 1994

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Memorial contributions are used to provide for the ongoing horticultural, education and research programs of the Desert Botanical Garden. Contributions have been received in memory of:

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Gifts through the Memorial Tree program provide for horticultural maintenance of the trees on Ullman Terrace. Contributions have been received in memory of:

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NEW YEAR'S EVE PARTY

The Garden's first fiscal New Year's Eve Party was held in honor of Robert & Karen Breunig who have left the Garden and moved to Santa Barbara, California. This fundraising event will provide important support for our ongoing programs. In addition to all who attended, we would like to thank the following for their special support:

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Pima Round House Rebuilt on Trail

Adrian Hendricks looks at the Pima round house which he rebuilt this summer on the *Plants and People of the Sonoran Desert* Trail. Adrian, who lives on the Gila River Indian Community reservation, learned to build round houses by working with an older Pima Indian man and is one of a shrinking number of Pima Indians experienced in building the structures.

The traditional house is made of slim willow trunks curved and wired together into a dome supported by a square of four large mesquite trunks. Arrowweed is threaded through the lattice-work of the dome, and a cap of soil added for protection from rain and heat.

This type of house, once commonly used for shelter and storage, is still constructed for a young woman's coming-of-age ceremony, Adrian said. ♦

Calendar of Special Events

Noche de las Luminarias

Dec. 1, 2, 3

5:30 - 9:30 p.m.

(Tickets available M-F
from 9 a.m. to noon at
DBG through Nov. 30
and at Ticketmaster
outlets Valleywide)

Music in the Garden

Spring Concerts
Sundays,

February 26
through April 16,
11:30 a.m. - 1 p.m.

(Optional brunch
available,
9:30 a.m. - 12:30 p.m.)



Carolyn O'Malley (left) and Marilyn Shomer, event chairwoman, make a presentation to Robert and Karen Breunig (below) at a farewell party for them. The fun-filled evening featured food, music and good wishes for the Breunigs. It raised \$16,000 for the Garden.



Photos by John Nemerovski

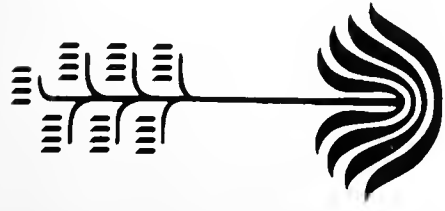
A (fiscal)
New Year's Eve
gala
at the end of
September
said "Farewell"
to the Breunigs
and raised funds
for the Garden.



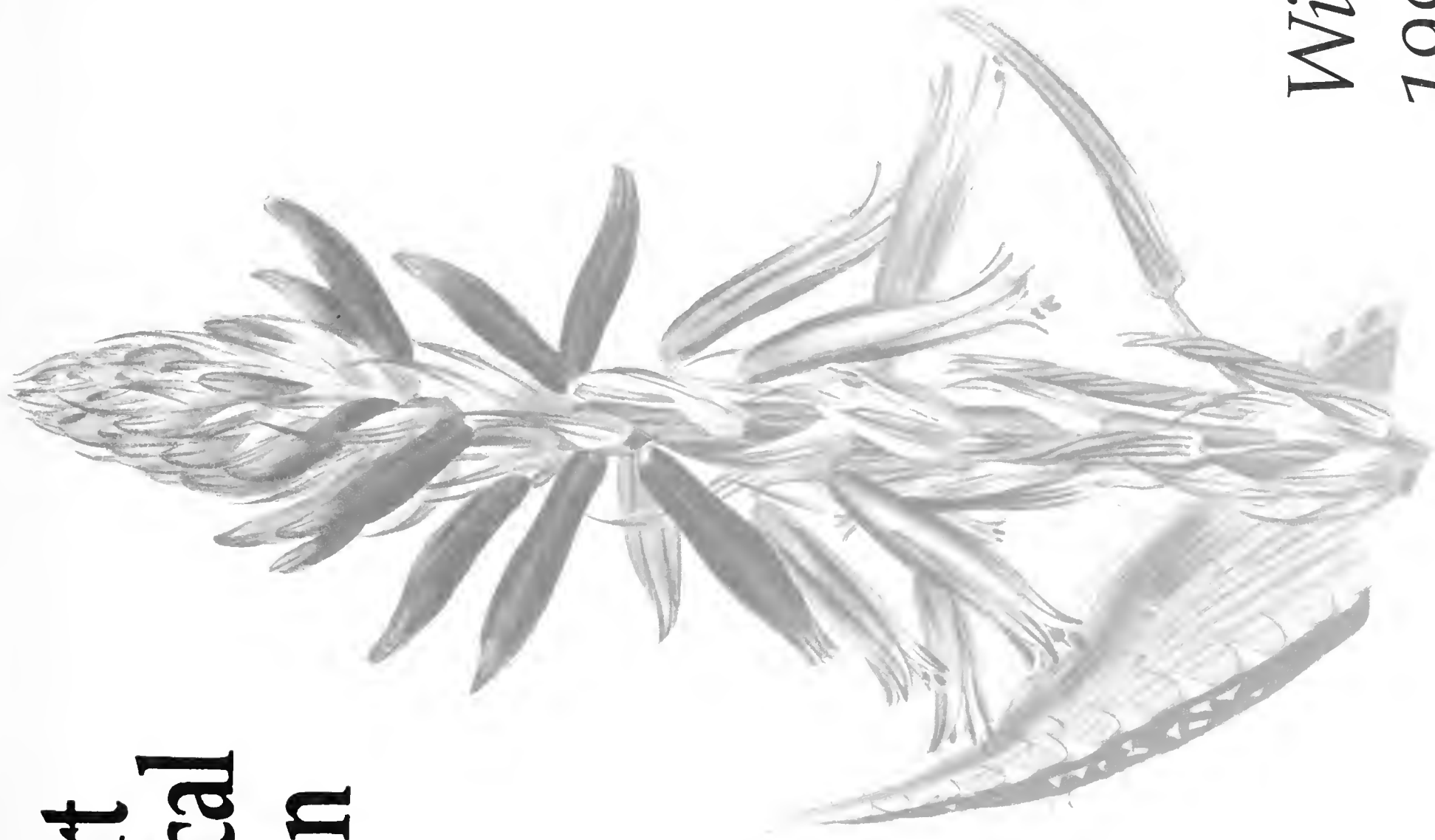
The Sonoran Quarterly
Desert Botanical Garden
1201 N. Galvin Parkway
Phoenix, AZ 85008
(602) 941-1225 (602)481-8143 TDD

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**Desert
Botanical
Garden**



Winter Calendar
1994/95

DECEMBER						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Touch of the Garden Desert Garden Walks <i>Noche de las Luminarias</i> (Member's Night)	2 Touch of the Garden Desert Garden Walks <i>Noche de las Luminarias</i>	3 Touch of the Garden Desert Garden Walks <i>Noche de las Luminarias</i>
4 Desert Garden Walks Desert House Tours	5 Birds in the Garden Desert Garden Walks	6 Touch of the Garden Desert Garden Walks	7 Touch of the Garden Desert Garden Walks	8 Holiday Wreaths Touch of the Garden Desert Garden Walks	9 Touch of the Garden Desert Garden Walks	10 Touch of the Garden Desert Garden Walks Talk-N-Tour (Members Only)
11 Desert Garden Walks Desert House Tours	12 Birds in the Garden Desert Garden Walks	13 Touch of the Garden Desert Garden Walks	14 Touch of the Garden Desert Garden Walks	15 Touch of the Garden Desert Garden Walks	16 Touch of the Garden Desert Garden Walks	17 Gourd Ornament Funshop Touch of the Garden Living Holiday Gifts Desert Garden Walks
18 Desert Garden Walks Desert House Tours	19 Birds in the Garden Desert Garden Walks	20 Desert Garden Walks	21 Desert Garden Walks	22 Desert Garden Walks	23 Desert Garden Walks	24 Desert Garden Walks
25 Garden Closed	26 Birds in the Garden Desert Garden Walks	27 Desert Garden Walks	28 Desert Garden Walks	29 Desert Garden Walks	30 Desert Garden Walks	31 Desert Garden Walks

JANUARY						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Desert Garden Walks Desert House Tours	2 Birds in the Garden Desert Garden Walks	3 Touch of the Garden Desert Garden Walks	4 Touch of the Garden Desert Garden Walks	5 Touch of the Garden Desert Garden Walks	6 Touch of the Garden Desert Garden Walks	7 Nature Sketching Pt. 1 Saguaro Cultivation Touch of the Garden Desert Garden Walks
8 Desert Garden Walks Desert House Tours Puppet Show	9 Birds in the Garden Desert Garden Walks	10 Touch of the Garden Desert Garden Walks	11 Touch of the Garden Desert Garden Walks Photography Lec. 1	12 Touch of the Garden Desert Garden Walks Herb Garden Pt. 1	13 Touch of the Garden Desert Garden Walks	14 Herb Garden Pt. 2 Touch of the Garden Discovery Watch Photography Out. 1 Desert Garden Walks
15 Desert Garden Walks Desert House Tours Puppet Show Winter Veg. Gardening	16 Birds in the Garden Desert Garden Walks Storage Basket Pt. 1	17 Touch of the Garden Desert Garden Walks	18 Touch of the Garden Desert Garden Walks Photography Lec. 2	19 Touch of the Garden Desert Garden Walks	20 Touch of the Garden Desert Garden Walks	21 Nature Sketching Pt. 2 Oil Painting Pt. 1 Photography Out. 2 Touch of the Garden Desert Garden Walks
22 Desert Garden Walks Desert House Tours Puppet Show	23 Birds in the Garden Desert Garden Walks Storage Basket Pt. 2	24 Touch of the Garden Desert Garden Walks	25 Touch of the Garden Desert Garden Walks Photography Lec. 3	26 Touch of the Garden Desert Garden Walks	27 Touch of the Garden Desert Garden Walks	28 Oil Painting Pt. 2 Photography Out. 3 Touch of the Garden Desert Garden Walks
29 Desert Garden Walks Desert House Tours	30 Birds in the Garden Desert Garden Walks	31 Pine Needle Basket Pt. 1 Touch of the Garden Desert Garden Walks				

FEBRUARY						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 Touch of the Garden Desert Garden Walks Photography Lec. 4	2 Touch of the Garden Desert Garden Walks	3 Touch of the Garden Desert Garden Walks	4 Nature Sketching Pt. 3 Oil Painting Pt. 3 Touch of the Garden Desert Garden Walks
5 Desert Garden Walks Desert House Tours Puppet Show	6 Birds in the Garden Desert Garden Walks	7 Pine Needle Basket Pt. 2 Touch of the Garden Desert Garden Walks	8 Touch of the Garden Desert Garden Walks	9 Touch of the Garden Desert Garden Walks	10 Scented Heart Basket Touch of the Garden Desert Garden Walks	11 Oil Painting Pt. 4 Touch of the Garden Desert Garden Walks
12 Desert Garden Walks Desert House Tours Puppet Show	13 Birds in the Garden Desert Garden Walks	14 SPROUTS Day 1 Touch of the Garden Desert Garden Walks	15 Touch of the Garden Desert Garden Walks	16 Touch of the Garden Desert Garden Walks	17 Touch of the Garden Desert Garden Walks	18 Nature Sketching Pt. 4 Touch of the Garden Discovery Watch Desert Garden Walks
19 Desert Garden Walks Desert House Tours Puppet Show	20 Birds in the Garden Desert Garden Walks	21 SPROUTS Day 2 Touch of the Garden Desert Garden Walks	22 Touch of the Garden Desert Garden Walks	23 Touch of the Garden Desert Garden Walks	24 Touch of the Garden Desert Garden Walks	25 Pruning Trees & Shrubs Touch of the Garden Landscaping/Diff. Loc. Desert Garden Walks
26 Desert Garden Walks Music in the Garden Desert House Tours	27 Birds in the Garden Desert Garden Walks	28 SPROUTS Day 3 & (continues thru March 21) Touch of the Garden Desert Garden Walks	<div><div>SALE</div><div><div>Spring Landscape Plant Sale</div><div>March 24, 25, & 26</div></div></div>			

SPECIAL EVENTS

Noche de las Luminarias

December 1*, 2, 3
Thursday*, Friday, Saturday
5:30 - 9:30 p.m.
Member adult: \$4, Member child: \$2;
Non-Member adult: \$8, Non-member child: \$4
Tickets must be purchased in advance and are sold through Ticketmaster (602) 784-4444 and 9-noon at the Garden for Members and Non-members. (Ticketmaster charges an additional per ticket handling fee.) For further information, call the Garden at (602) 941-1225.

*(Members Only)

The 400+ members of "Volunteers in the Garden" present the 1994 edition of their annual fundraiser. Join them for an evening of beauty and entertainment as the Garden is lit with thousands of traditional luminarias. A wonderful variety of musical entertainment is located throughout the Garden along with complimentary cookies and cider. An optional a la carte menu of great food may be purchased from Serranos to round out a delightful holiday experience. Proceeds help the Garden in its mission.

Music in the Garden

Sundays
February 26
March 5, 12, 19, 26
April 2, 9, 16
Concert: 11:30 a.m. - 1 p.m.
Optional Brunch: 9:30 a.m. - 12:30 p.m.
Ullman Terrace
Tickets are \$5 per person, which does not include Garden admission, and are purchased in advance.

Relax on the Garden's cool Ullman Terrace and enjoy the sounds of your favorite local musical groups. An optional Sunday brunch is also available. Music in the Garden is a perfect way to entertain out-of-town guests or just relax after a long week. Tickets are required and may be purchased in advance by phone with a credit card at (602) 941-1225. A list of concert performers is also available. Concert tickets do not include the price of the optional brunch.

TRAIL ACTIVITIES

"Desert Detective: The Case of the Living Desert"

Every day
Year-round
During Garden hours
Pick up free copies at Garden Admissions
This free activity/game sheet encourages everyone to use observation skills to discover the mysteries of the desert during their Garden visit. Find out what kind of Desert Detective you are! The "Desert Detective: Case of the Living Desert" is printed through the generosity of American Express.

Desert Garden Walks

Every day
December, January, February
Sun. & Mon.: 9 a.m., 3:30 & 4:30 p.m.
Tues. - Sat.: 11 a.m., 1 p.m., 3:30 p.m., 4:30 p.m.
(Except: The week of Dec. 20 - Dec. 31, no 11 a.m. or 1 p.m. tours)
Meet at Public Tour Waiting Area
Free with Garden admission
Join this fascinating one-hour tour, guided by Garden docents, and learn how plants, animals and people have adapted to the deserts of the world. Bring your camera, your questions and wear comfortable walking shoes.

Desert House Tours

Sundays (except Dec. 25)
December, January, February
1 - 3 p.m.

Meet at Desert House courtyard on the Center for Desert Living trail
Free with Garden admission
Join the Garden's interpretive naturalist and volunteers for a look inside the water and energy conserving Desert House. Find out how researchers are monitoring the water and energy systems of the house. The Desert House and its adjacent exhibits show some of the best ways to conserve our precious water and energy resources and save money too! The water and energy saving techniques and materials used to design, build and landscape Desert House are available for use by homeowners today. Discover methods to incorporate water and energy saving devices into your home.

"A Touch of the Garden"

Tuesdays through Saturdays
(except between Dec. 20 - Dec. 31)
Dec. 1 - 17, Jan. 3 - Feb. 28
10 a.m. - 1 p.m.

Along the Garden trails
Free with Garden admission
Tour the Garden at your own pace with stops at investigation stations. These demonstration activities give visitors a chance to touch and experience the remarkable adaptations of plants, animals and people in their natural environment. This is a perfect way for individuals and groups of any size to explore the Garden. "A Touch of the Garden" is sponsored by American Express.

Birds in the Garden

Mondays
December, January, February
8:00 a.m.
Meet at Garden Admissions
Free with Garden admission
Many desert birds make their home in the natural setting of the Garden. Many more use the Garden as a stopping point in their annual migrations. During this one hour, docent-guided tour, discover the many varieties of birds in the Garden and the different ways they have adapted to living in the desert environment. We recommend wearing comfortable walking shoes and bringing field glasses or binoculars.

Living Holiday Gifts:

A Demonstration

Saturday
December 17
11 a.m. - 2 p.m.
Archer House patio
Free with Garden admission
Do you have someone who is difficult to buy for on your holiday shopping list? Why not give an interesting, attractive potted plant? Kirti Mathura gives some great ideas for plant selections, potting and care. The Garden's Sales Greenhouse is a great stop to purchase that special "gift" and to save some time, you can have the Sales Greenhouse staff pot it for you, too!

MEMBERS ONLY

Talk-n-Tour

Saturday
December 10
3 p.m.
Meet at the Orientation Amphitheater
Members Only
Desert Botanical Garden members are invited to attend a free Talk-n-Tour focusing on rare and endangered plants. The Garden's rarely opened conservation greenhouse is the highlight of the tour as members have this special chance to see rare and endangered plants in the Garden's collection. Curator of the Living Collection, Liz Slauson, leads the tour and describes the Garden's conservation program. Join us after the tour for the drawing for the trip to Kauai, Hawaii for those members who participated in our Member-Get-A-Member program. Hope to see you there!!

PHOTOGRAPHY

Winter Garden Photography:

Desert Shapes and Shadows

LECTURES:
Wednesdays
January 11, 18, 25
February 1
7 - 9:30 p.m.
Webster Auditorium
GARDENPHOTOOUTINGS:
Saturdays
January 14, 21, 28
9 a.m. - 1 p.m.
Meet at Garden Admissions
Instructor: John Nemerovski.
Non-members, \$75; Members, \$65
Advanced registration required
Winter in the desert: The light is low and clear. The shadows are long and deep. Everything slows down, waiting patiently. In the Garden, the forms alone present themselves to the creative photographer. This class explores, in both color and black & white, the outstanding photographic richness of the Desert Botanical Garden in winter. All photographers are welcome in this informative and enjoyable class. Bring your camera and a few of your photos (prints or slides, color or black-and-white). The classes feature technical and creative aspects of winter Garden photography. The Saturday morning outings will cover the Desert Botanical Garden.

DESERT LANDSCAPING & HORTICULTURE

Care and Cultivation of Saguaros

Saturday
January 7
9 a.m. - Noon
Webster Auditorium
Instructor: César Mazier
Non-members, \$14; Members, \$12
Advanced registration required
The beautiful and stately saguaro cactus is the signature plant of the Sonoran Desert. Many homeowners enjoy having this tall wonder as the focal point of their home landscapes. This informative workshop combines a lecture and a Garden demonstration to deal with several subjects including how the saguaro grows, how to properly transplant and maintain it, and how often the saguaro should be watered.

Design and Care of Your Herb Garden: A 2-part workshop

Thursday & Saturday
January 12 & 14
January 12: 6:30 - 8:30 p.m.,
Webster Auditorium
January 14: 9 - 11:30 a.m.,
Archer House Patio
Instructor: Kirti Mathura & Judyth Shamosh
Non-members, \$48; Members, \$40
Advanced registration required
This 2-part workshop gives participants the start-to-finish knowledge needed to design and care for their own herb garden. Session 1 covers the basics of herb propagation, as well as cultivation, soils, location and watering involved in desert herb gardening. Includes information on herbs that are good for culinary, medicinal, and craft uses. In session 2, participants actually design an herb bed, or decide where to incorporate herb plants into an overall landscape.

Winter Vegetable Gardening for the Family

Sunday
January 15
2:30 - 5 p.m.
Instructor: Mary Irish & Kirti Mathura
Non-members, \$24 per adult or \$48 per family (up to 2 children - \$5 per additional child)
Members, \$20 per adult or \$40 per family (up to 2 children - \$5 per additional child)
Advanced registration required
This workshop gives adults and their children an opportunity to experience the joys of gardening. The adults find out what is appropriate to plant at this time of the year, how to plant it, tips on getting a good crop, and where to buy seed. The children have the chance to learn some fun basic gardening skills. Both groups will visit the Rhuart Landscape Demonstration Garden to experience some hands-on planting.

Pruning Desert Trees and Shrubs

Saturday
February 25
8 a.m. - Noon
Webster Auditorium
Instructor: César Mazier
Non-members, \$20; Members, \$18
Advanced registration required
Proper pruning techniques help maintain the health and beauty of desert trees and shrubs. The workshop combines lecture and demonstration and an opportunity to see how some of the Garden's mature trees and shrubs are maintained. This includes information on how to help trees form lovely shade canopies. Superintendent of Garden Horticulture César also demonstrates the techniques for pruning desert shrubs to maintain their beauty in a desert landscape.

Landscaping for Difficult Locations

Saturday
February 25
10 a.m. - Noon
Archer House Patio
Instructor: Kirti Mathura
Non-members, \$24; Members, \$20
Advanced registration required
Do you have a problem spot (or more than one) in your landscape? Too much shade, sun, wind or problem soil? This class gives some ideas on which plants grow in those locations. Includes a walking tour to view some of the Garden's mature plants. Wear comfortable shoes and bring your camera.

GARDEN VOLUNTEERING

"SPROUTS": A Volunteer

General Orientation
Tuesdays
February 14 to March 21
9 - 11 a.m.
Webster Auditorium
No Charge
Become a part of the Volunteers in the Garden Volunteer Organization. "SPROUTS" is a 6-part orientation for new volunteers to the Desert Botanical Garden's mission and philosophy. This orientation gives an in-depth look at the responsibilities of the Garden's departments and how these relate to volunteers participating in each department's volunteer program. For more information or to receive an invitation to "SPROUTS," please call Pat Smith at (602) 941-1225.

Plant Questions Hotline

If you have questions about your desert landscape or plants, please call the Desert Botanical Garden Plant Questions Hotline.
We will do our best to help you.
The Hotline operates 10 - 11:30 a.m.,
Monday through Friday at
(602) 941-1225.

ART IN THE GARDEN

Nature Sketching Class:
A 4-Part Workshop

Saturdays
Jan. 7, 21 & Feb. 4, 18
8 - 11 a.m.
Begins on Eliot Patio
Instructor: Catherine Sawner.
Non-members, \$70; Members, \$60
Advanced registration required
Everyone has creative talents. The Garden is the perfect inspiration to let creative feelings go and get them on paper. This sketching series offers participants the opportunity to experience the excitement of producing what they see. Outdoor, on-location sketching includes instruction in several simple, fun techniques using different mediums which include: pencil, pen/ink and scratchboard, watercolor pencils and watercolor crayons. A materials list is provided with the class registration confirmation (approximate cost of materials is \$15).



Oil and Acrylic Painting:
A 4-Part Workshop

Saturdays
Jan. 21, 28 & Feb. 4, 11
9 a.m. - Noon
Webster Auditorium
Instructor: Florence Laurens-Eberson
Non-members, \$70; Members, \$60
Advanced registration required
This workshop emphasizes that the way you see is the way you paint. Florence begins with the impressions of what a person sees. From that impression all other directions develop. The first day's instruction includes drawing, some sketching, layout, color explanation, how to handle the paint palette, color mixing, choosing a subject and simple work on canvas. In the next 3 sessions, participants work on their chosen project. The subject is first painted in an impressionist style then goes on to more precise work if desired. Participants may finish the 4 sessions with up to 2 paintings. This workshop accommodates the beginning to intermediate artist with lots of individual instruction. A materials list is provided with the class registration confirmation (approximate cost of materials is \$35).



CHILDREN'S ACTIVITIES

Gourd Ornament Funshop

Saturday
December 17
9 a.m. - Noon
Webster Auditorium
Ages 6 - 12 years old
Instructor: Barbara Gronemann
Non-members, \$16; Members, \$14.
The fascinating mystique of gourds is discovered through their many uses by native Sonoran people. Children transform their own gourds into decorative ornaments as they learn about rattles, containers, canteens, dippers, masks, and toys. The funshop price includes materials.



Garden Puppet Shows

Sundays
January 8, 15, 22
February 5, 12, 19
1:30 - 2:30 p.m.
Webster Auditorium
Free with Garden Admission
These puppet shows have been specially created by The Great Arizona Puppet Theater. Audiences of all ages enjoy actively participating in the shows while learning how animals, plants and people live in the desert.



January 8: "Creepy, Crawly, Wild & Woolly"
January 15: "Zoner and the Drip"
January 22: "Zoner's Water Cycle"
February 5: "Hotel Saguaro"
February 12: "Seasons of the Desert"
February 19: "Creepy, Crawly, Wild & Woolly"

Winter Vegetable Gardening for the Family

(Please see description under Desert Landscaping & Horticulture)

Discovery Watch

Saturday
January 14 (7 to 10 year olds)
February 18 (4 to 6 year olds with parents)
10 - 11:30 a.m.
Webster Auditorium
Instructor: Barbara Gronemann
Non-members, \$14; Members, \$12.
Children take a discovery walk through the Garden to develop the art of watching skills. They thrill at their sightings of birds, new plant blooms, animals, and insects. Cameras are a welcome addition to this walk. Besides learning to use a watch list, the children learn about the creatures and plants they've spotted and how they relate to the ecosystem of the desert. Children make and take home a pressed bookmark of dried desert plant as a memento of their walk.

NATURAL CRAFTS

Holiday Wreaths

Thursday
December 8
9 a.m. - 2 p.m.
Webster Auditorium
Instructor: Bonnie Bogie.
Non-members, \$60; Members, \$50
Advanced registration required
Add beauty and fragrance to your home this holiday season with a colorful, scented wreath. The wreath is made from a variety of herbs, twigs, flowers, vines and everlastings. These uniquely styled wreaths can be hung over a mantel or used to welcome guests.

Extra Large Storage Basket with Lid: A 2-Part Workshop

Mondays
January 16 & 23
9 a.m. - 2 p.m.
Webster Auditorium
Instructor: Bonnie Bogie
Non-members, \$108; Members, \$90.
Advanced registration required
This large, useful basket is approximately 3 feet tall. It has handles, a sturdy base and rim, and a lid with a handle. The basket can be used as a laundry or storage basket. It will last for years and it is also washable.

Pine Needle Basketry:
A 2-Part Workshop

Tuesdays
Jan. 31 & Feb. 7
9 a.m. - 2 p.m.
Webster Auditorium
Instructor: Sharie Monsam.
Non-members, \$28; Members, \$24
Advanced registration required
Participants in this 2-part workshop learn how to use this natural plant material to coil weave baskets. During the second session, the baskets are personalized with colorful decorations and a lid. All materials for each participant's basket are included in the workshop price.



Scented Heart Basket

Friday
February 10
9 a.m. - 2 p.m.
Webster Auditorium
Instructor: Bonnie Bogie.
Non-members, \$55; Members, \$45
Advanced registration required
Create a beautiful heart-shaped basket for someone special in your life or a favorite spot in your home. The basket's rim is decorated with flowers and scented with herbal "love potions."

INSTRUCTORS - WINTER 94/95

Benítez, Germán - The Desert Botanical Garden's interpretive naturalist. He joined the Garden in 1993 as a volunteer. Germán received an Associate degree in Botany from the Universidad Simón Bolívar, an Associate degree in horticulture from Escuela Nacional Agropecuaria, and trained as a landscape designer at the Instituto Superior Gasán Martínez all in Caracas, Venezuela. He taught college classes in historic horticulture, seeding, growth and harvesting techniques for different farmer's communities and trained landscaping employees in basic botany and skill development.

"Bogie" Bogenschutz, Bonnie - Advisor to the Desert Art Studio, Member of VAA, and creator and designer of the Gypsy Flower collection that is now being marketed throughout the country. She has taught classes in Canada, Arizona and California. Her work is in galleries in all those areas.

Desert Botanical Garden Volunteers - These volunteers have extensive training in desert ecology. This training has also included experience in educational interpretation and horticulture.

Great Arizona Puppet Theater - Co-founded by professional puppeteers, Nancy Smith and Ken Bonar, and incorporated in 1983 as touring theater in Arizona. The company's permanent downtown theater opened in 1988 featuring weekend performances of traditional and Arizona heritage stories. The company tours and conducts classes and workshops. She is the author of *Hohokam Arts and Crafts*.

Gronemann, Barbara - An educator and research specialist on the U.S. Southwest. She has a Masters degree in education from Columbia University and is a certified teacher. Barbara is a former museum educator at Pueblo Grande Museum. She is the director of Southwest Learning Sources and has taught classes at the Garden since 1981.

Irish, Mary - Director of public horticulture for the Desert Botanical Garden. She directs the Garden's public horticulture and plant introduction programs. Mary supervises the propagation of plants from the Garden's collection to be sold in the Sales Greenhouse and the Fall and Spring Landscape Plant Sales. She is coordinating the Garden's new *Center for Desert Living* trail which includes *Desert House* and the *Rhuart Landscape Demonstration Garden*.

Laurens-Eberson, Florence - An artist whose current subjects are desert landscapes and historical buildings of the U.S. Southwest. She emigrated to the United States from Holland in 1958. Florence completed her studies at Arizona State University with a Bachelor of Fine Arts in 1976. She has had numerous shows and exhibits, currently owns her own art studio and is actively engaged in many art projects.

Mathura, Kirti - Horticulturist and propagator for the Garden's Plant Introduction Program. She has a Bachelor of Science degree in botany and environmental biology. Kirti has helped collect data for various wildlife and vegetation studies and has extensive experience in all types of propagation.

Mazier, César - Superintendent of Horticulture at the Desert Botanical Garden. His duties include managing the Garden's horticulture department. He received a Bachelor of Science degree in agriculture from the University of Honduras and holds a Master's degree in agriculture from New Mexico State University. A certified arborist, César joined the Garden in 1987.

Monsam, Sharie - 1988 Artist of the Year for the city of Mesa. She has been teaching fiber art classes in the Valley since 1976 and began teaching at the Garden in 1985. Chosen to represent Arizona in Canadian fiber art shows in 1986, Sharie has also participated in shows in California and New Mexico. One of her tapestries is in the sanctuary of St. Bridget Catholic Church in Mesa, Arizona.

Nemerovski, John - A professional photographer, workshop leader, and writer, he has done extensive photography for the Desert Botanical Garden, Boyce Thompson Southwestern Arboretum, and Chicago Botanic Garden. John conducts native plant, wilderness, and darkroom classes for the Scottsdale Photography Workshop. He believes photography should be fun.

Sawner, Catherine - A botanical illustrator, she has a Bachelor of Fine Arts degree in botanical illustration from the University of Illinois. Catherine has produced illustrations for many publications and institutions, and was juried into Flora '92, a botanical art exhibition at the Chicago Botanic Garden. She has incorporated the desert flora into her work since moving to Arizona, and is currently producing a series of desert botanicals in watercolor pencil.

Shamosh, Judyth Anne - A vice president of the Arizona Herb Association, a Master Gardener, and a designer of a number of community gardens. Judyth earned a Bachelor of Science degree in oceanography from Southern Connecticut State University. She worked as an archaeologist at Salmon Ruin in New Mexico during the summers of 1972 to 1976. She has been an organic gardener in Phoenix since 1979 growing vegetables, flowers, and a wide range of culinary and medicinal herbs which she uses to make preparations for nutritional counseling. Judyth began her studies of herbology in 1980 and continues to expand her knowledge with her studies of Ayurvedic Medicine. Currently, she teaches her original BodySynergy Stretch Alignment classes at her studio in Phoenix.

Slauson, Liz - The Desert Botanical Garden's curator of the living collection/research botanist. She joined the Garden in 1988 as an intern working in the Garden's Australian section. Liz is also the director of the Garden's rare plant program, part of the Center for Plant Conservation. She is currently working on her Doctorate in botany studying the pollination ecology and systematics of *Agave chrysantha* and *Agave palmeri*.

GARDEN HOURS

The Garden is open every day of the year, including holidays, except December 25.

October-April	8 a.m. - 8 p.m.
May-September	7 a.m. - 10 p.m.
Office Hours (Mon.-Fri.)	8 a.m. - 5 p.m.
Desert House Exhibits	9 a.m. - 5 p.m.
Desert House (Sundays)	1 p.m. - 3 p.m.
Gift Shop	9 a.m. - 5 p.m.
Sales Greenhouse	10 a.m. - 4 p.m.

ADMISSION

Adults	\$6.00
Seniors	\$5.00
Children 5-12	\$1.00
Children under 5	Free
Members	Free

Special rates are available for student field trips and adult groups of 10 or more.
Call 941-1225, Mon.-Fri., 8 a.m. - 5 p.m., for more information.

Noche de las Luminarias December 1, 2, & 3



Desert Botanical Garden
1201 N. Galvin Parkway
Phoenix, AZ 85008
(602) 941-1225 (602) 481-8143 TDD



MEMBERSHIP APPLICATION

Become a Member today! If you're not already a member or if you know someone who would enjoy Garden membership as a gift, consider all the benefits of joining: Unlimited free admission for one year; guest passes for family or friends; four free packets of desert-plant seeds; a subscription to all our publications including this *Quarterly Calendar*; invitations to preview events; discounts on classes and at the Garden Gift Shop and Greenhouse.

☐ Yes! I want to enjoy the benefits of Garden Membership.
Category of Membership I have selected:

- ☐ \$35 - *Individual* - All benefits PLUS 4 guest passes
- ☐ \$45 - *Family* - All benefits PLUS 4 guest passes
- ☐ \$75 - *Contributing* - All benefits PLUS 8 guest passes
- ☐ \$150 - *Agave Century Club* - All benefits PLUS 10 guest passes, invitation to special Agave Century Club events, recognition in Garden publications
- ☐ \$500 - *Ocotillo Club* - All benefits PLUS 12 guest passes, special recognition in Garden publications, invitation to selected Saguaro Society events and a copy of *Sonoran Desert Spring* by John Alcock.
- ☐ \$1,000 - *Saguaro Society*
- ☐ \$5,000 - *Director's Circle*
- ☐ \$10,000 - *President's Club*

- All benefits PLUS unlimited guest privileges, invitation to Saguaro Society events and recognition in Garden publications.

Name _____

Address _____

Phone _____

☐ Check here if you would like your seed packets

☐ Check enclosed Please bill my: ☐ Visa ☐ MasterCard

☐ AMEX ☐ Discover

Card Number _____

Expiration Date _____

REGISTRATION FORM

Class sizes are limited. We regret that receipt of your check does not guarantee enrollment. Your enrollment will be confirmed by mail and if the class is not available, your check will be returned to you. Send this form to the Desert Botanical Garden at 1201 N. Galvin Parkway, Phoenix, AZ 85008. You may also register in person, or by phone with a credit card by calling (602) 941-1225.

Activity _____

Fee

\$

\$

\$

\$

Total

\$

☐ Check enclosed Please bill my: ☐ Visa ☐ MasterCard

☐ AMEX ☐ Discover

Card Number _____

Phone _____

Expiration Date _____